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AN AMERICAN JOURNAL OF NEUROLOGY AND PSYCHIATRY
FOUNDED IN 1874

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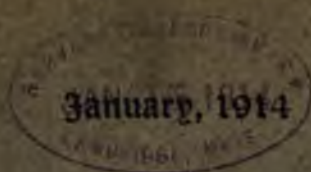
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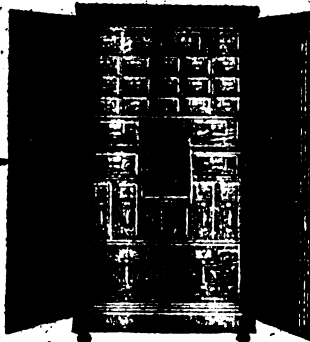


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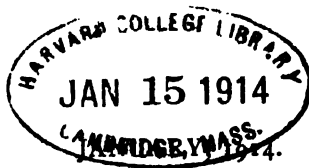
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The Journal OF Nervous and Mental Disease

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Original Articles

TWO CASES OF REMOVAL OF EXTRA-DURAL TUMOR OF THE SPINAL CORD¹

By PHILIP COOMBS KNAPP, A.M., M.D.

PHYSICIAN FOR DISEASES OF THE NERVOUS SYSTEM, BOSTON CITY HOSPITAL

Tumors affecting the spinal cord, whether of vertebral or intra-vertebral origin, are rare. An intra-vertebral growth was found in only four out of 3,617 autopsies at the Boston City Hospital. The vertebral canal, however, has rarely been opened at the autopsies at the hospital unless the clinical history indicated some lesion of the cord, but a tumor of the cord is far less likely to exist without causing symptoms than is a tumor of the brain. Clinically, tumors of the cord seem somewhat more common. Out of 1,500 patients admitted to the neurological service a tumor was found at the autopsy in three; in three more the diagnosis was made but not confirmed by autopsy; and in six more an operation was performed. In five of these cases a definite lesion was found at the point of operation, but one was a case of localized serous meningitis. The sixth case showed only a slight edema of the cord.

Inasmuch as operations on tumors of the cord are still comparatively rare, it seems justifiable to report two cases in the neurological service in which a tumor was removed with benefit. Laminectomy has been performed at the hospital for removal of

¹ Read at the meeting of the American Neurological Association at Washington, May 5, 1913.

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a tumor of the cord upon twelve patients. Six patients died as a result of the operation. In one case nothing was found; in two a malignant growth was found which could not be removed; in the fourth a thickening of the meninges was removed; the fifth was a myeloma of the vertebræ; and the sixth proved to be syringomyelia. The other six cases survived the operation and showed more or less improvement, but in five the improvement went only so far that they could get about on crutches with more or less difficulty. One of these cases showed a malignant disease of the vertebræ which could not be removed; the second was a localized serous meningitis; the third showed only some edema of the cord; the fourth had a tumor of the dura which completely surrounded the cord; and the other two were the cases of extra-dural growth which I am about to report.

CASE I. Mary B., 40, married, Irish, entered the hospital May 20, 1912. The family history was negative. She had had no children or miscarriages; menopause in 1909. Considerable alcohol; no history of syphilis; previous history not remarkable. A year before coming to the hospital she had some pain in the back, lasting two or three weeks; six months later this pain returned. It was situated between the shoulders, was sharp in character, and shot into the breasts. There was a duller pain in the lower part of the back. This pain was made worse by any jar or movement. Since February the pain had grown worse. Six weeks ago the legs began to feel numb and three weeks ago she had to be catheterized once. For two weeks the legs had been numb and weak, movements were slow and, for four or five days, she had been unable to stand, but there was no pain in the legs. There was no headache, disturbance of vision or vertigo. Mentally she was clear. She had a slight cough at times. The appetite and digestion were good, the bowels were regular and she had voluntary control of them. Micturition was difficult at times, but there was no incontinence. Sexual desire was unaffected.

She was a well-developed, rather stout woman, looking older than the age stated. No glandular enlargement could be felt. The right pupil was larger than the left, but both reacted normally. A few fine râles were heard over the back of the chest at the base of the lungs. The blood pressure was 148, the white blood count 12,800. She could not bear her weight on the legs. The knee jerks were normal at first, but later exaggerated. Two weeks after entrance she could not pass urine, and the ankles were a little edematous.

June 7 I was asked to see her by Dr. J. W. Bartol. There was some rigidity of the upper dorsal spine. Both legs were paretic and the left foot was almost completely paralyzed. Muscular

tonus was increased in the legs and there was contracture of both feet in plantar flexion, more marked on the left side. The knee jerks were exaggerated and there was a double Babinski reflex. Sensibility was diminished from the level of the lower end of the sternum downwards, more to pain than to contact, but the diminution was less marked in the legs and buttocks. She was transferred to my service June 10.

On that date the pupils were equal, reacting normally. Ocular movements were normal and there was no diplopia. The visual fields and fundi were normal. The pulse and temperature were not remarkable. The heart was not enlarged, the sounds were clear, there were no murmurs, but the aortic second sound was somewhat accentuated. Nothing abnormal was found in the lungs. The abdomen was slightly tympanitic but not tender. The urine showed the slightest possible trace of albumen and a few pus cells. The Wassermann and Noguchi tests were positive in the blood. Lumbar puncture gave a clear cerebro-spinal fluid, not under tension, with a cell count of 20, no globulin reaction and negative Wassermann and Noguchi reactions. The X-ray plate showed a somewhat vague shadow in the upper dorsal region, but no actual disease could be made out. Motion and sensation in the face, arms and upper part of the trunk were normal. The arm reflexes were present and equal. She could not stand unless almost completely supported, or take any steps in walking except with the right foot. She could flex the right thigh on the trunk somewhat, the left very slightly. The right leg could be rotated inwards fairly well, but outwards very little; the left leg could not be rotated at all. The right leg could be adducted but not abducted; the left leg could neither be adducted nor abducted. The right leg could be flexed and extended at the knee fairly well; the left could be flexed about five degrees, but it could not be extended at all. The feet were both in plantar flexion. The right foot could be flexed and extended, the left scarcely at all. The toes of the right foot could be moved; those of the left were moved hardly perceptibly. Neither foot could be moved laterally. The knee jerks were exaggerated, there was a front tap contraction, and on the left a spurious patellar and ankle clonus, the latter marked at times by the contracture of the foot. Babinski and Oppenheim reflexes were present on both sides, but there were no Gordon, Mendel-Bechterew or Rossolimo reflexes. The abdominal reflex was absent. On flexing the foot there was a marked reflex flexion of the thigh on the trunk,—a reflex which I have observed before in certain cases of extreme spastic paraplegia of spinal origin, and which has since been described by Marie, Babinski and Cohn. Tonus in the legs was much increased. The hypesthesia and hypalgesia were marked on the left side, and there was also hypesthesia to thermal stimuli in the left leg. (Fig. 1.)

Although the result of lumbar puncture rendered it less probable that the specific process had involved the cord, she was given a drachm and a half of mercurial ointment as an inunction daily, and thirty grains of iodide of potassium three times a day. She was fairly comfortable and was able to sit up in a chair most of the time. The pain was often troublesome and the legs grew more numb and she was able to move them less and less. On July 2 she was given 0.4 grm. of salvarsan intravenously. There was no improvement and on July 17 some hypesthesia was discovered on the ulnar side of the forearm and upper arm. On July 15 a second

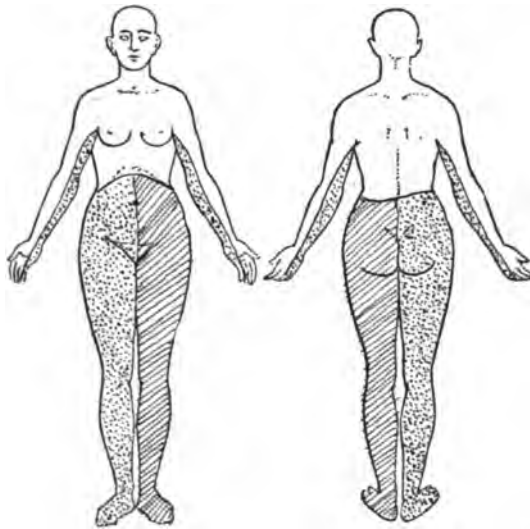


FIG. 1. Shaded region, area of more marked hypesthesia to contact, pain and temperature; dotted region, area of less marked hypesthesia to pain and contact and subsequent hypesthesia in arms.

dose of salvarsan (0.6 grm.) had been given. She had a good deal of pain in the back and legs, and some pain in the arms. The feet could not be moved at all. It became harder to pass her water and at times she had to be catheterized.

The diagnosis of a lesion at about the seventh dorsal segment had been made, which was not improbably a tumor, although the positive Wassermann and Noguchi reactions showed that it might be a specific process. The failure of specific treatment, however, justified an exploration of the vertebral canal at that point, and she was transferred to the surgical service on July 28.

On July 30 a laminectomy was performed by Dr. E. H. Nichols. An incision was made from the first to the eighth dorsal spinous process, and the muscles cleaned from the spine

on either side exposing the laminæ. The laminæ from the third to the seventh inclusive were removed, and the dura exposed. Two small masses, resembling granulation tissue in structure, were found, apparently growing from the dura at the level of the sixth dorsal spinous process. These masses were about three quarters of a centimeter in diameter, and were removed with a curette. The dura was not opened. The skin and muscles were closed with a through and through silk worm gut suture and the patient made a good ether recovery. By some accident the nature of the growth could not be determined; the pathological report being negative.

On August 3 the pulse and temperature were practically normal, the wound was clean, the bowels were moved by an enema, but catheterization was still necessary. She had less pain in the legs and could move her toes a little. During the next fortnight, however, the general condition was not so good. She had some fever, although never over 102° F., and the pulse was rapid, 100 to 110. There was some redness of the wound. The pain increased, she could not move her legs, and there was some involuntary flexion of the knees, with some incontinence of urine. During the last week in August the general condition began to improve, the fever disappeared, and there was less pain. She could flex the legs and feet, although extension at the knee was difficult. Under active and passive movements of the legs the motility improved and sensation became better.

On September 26 she was transferred back to the neurological service under the care of Dr. J. J. Thomas, to whom I am indebted for the subsequent history of the case while she remained in the hospital. She had no pain such as she had had before, but there was some backache from lying in bed. The legs were stronger, but the right leg felt strangely, as if there were no circulation in it. The retention of urine had disappeared. The pupils were equal and reacted normally, but the right pupil was oval in shape. The abdomen was tense and there was some dullness in the left lower quadrant. There was no nystagmus, diplopia, or disturbance of the visual field. The heart and lungs were normal. The arm reflexes were present. There were some hypesthesia and hypalgesia from the fifth to the ninth dorsal root areas, and in both legs. She could flex the legs at the knees feebly and extend them with fair strength. Dorsal extension of the right foot could be fairly well performed, and of the left foot partly. Plantar flexion was quite good. The knee jerks were still exaggerated, the right being greater than the left. There were a slight patellar clonus and a double Babinski reflex, but no Oppenheim.

On September 30 she was able to stand for the first time in months. She had to be supported on both sides but she bore considerable weight on her feet, although the knees gave way. She raised her legs high, as if going upstairs, in trying to walk. She

also had considerable pain radiating from the back to the sides. The Wassermann and Noguchi reactions were negative.

By the middle of October she was able to feel a light touch everywhere, to locate sensations correctly and to distinguish between the head and point of a pin, but there was a slight hypesthesia from the sixth rib downwards. She could make all movements of the feet and legs with fair strength. The knee jerks were still unequal and there was a double Babinski reflex, but no clonus. There was no incontinence or retention of urine. She was able to walk with the aid of crutches with considerable fatigue. The legs felt stiff and she had some lumbar pain. On November 5 sensibility was apparently normal everywhere, and the strength of the legs was good. She could walk fairly well on crutches but there was still some spasticity. The knee jerks were still unequal and there were a slight clonus and a Babinski reflex on the right. On that date she left the hospital at her own request.

On January 10, 1913, she was admitted to the Long Island Hospital and I am indebted to Dr. J. S. Tomkies for her further history. On admission she stated that about a year before she fell on her back on the sidewalk. She did not suffer much pain and was able to walk home. About a month later she began to lose power in the legs, and this weakness gradually increased. She also denied any indulgence in alcohol. She stated that she was able to walk on leaving the City Hospital, but was unable to do so when she came to Long Island, although she could stand on crutches. She had constant pain in the back, so severe as to keep her awake. The legs quivered most of the time, especially at night, and were cold from the knees down. She was able to flex the legs and abduct and adduct the feet. There was no paralysis, but the right leg was stronger than the left. There was slight spasm of the left leg and marked spasm of the right. She made an occasional mistake as to the position of her limbs, but sensibility to heat, cold, pain and touch were normal. The knee jerks were exaggerated, especially on the right, and on both sides there was an ankle and patellar clonus. The Babinski, Oppenheim and Gordon reflexes were present. Coördination was normal. The scar of operation measured 20 cm. and the spinous processes from the third to the tenth dorsal were missing. On the 15th the Wassermann reaction was negative.

Under active and passive movements she improved so that on the 19th she was able to walk with only slight aid from one person. The gait was spastic-ataxic. On the 28th she is reported as having full control of the sphincters, and on entrance there was no incontinence, but only a burning sensation and frequent micturition. She continued to improve a little up to February 1.

Although the improvement has not been very great, nevertheless there has been enough power regained to enable her to walk about with help, instead of being completely paraplegic, and she

has recovered the sensibility of the limbs and the control of the sphincters, which seems to justify the operation.

CASE II. Jennie R., 33, married, a native of Italy, was referred to me on July 29, 1912, by Dr. N. P. Breed of Lynn, and, by my advice, entered the neurological service at the City Hospital on the following day. The family history and the previous history revealed nothing remarkable. She had had four children, with nothing noteworthy about the pregnancies or labors except that on one or more occasions forceps were used. As a result of some uterine disturbance an abdominal operation—probably ventral fixation—had been performed in the summer of 1911. In 1909, while in the sixth month of her fourth pregnancy, she began to have a dull, burning, pulling pain in the right lumbar and gluteal regions, going down the back of the leg. The labor was normal and easy, but after it there was some swelling of the legs and increasing weakness, so that she had much difficulty in walking. About eight or nine months after the appearance of the pain on the right side she began to have pain in the left leg as well. This pain continued but was not of very great severity apparently. Not long after she began to lose her sexual desire and micturition and defecation grew more imperative, although she knew when she was passing urine or feces and there was seldom actual incontinence. After the abdominal operation the difficulty in walking increased, and, two or three months later, she began to have a girdle sensation about the waist. She was more comfortable when lying down than when sitting or standing, and the pain in the back of the leg was increased especially on sitting, from the pressure of the chair. The legs, for the last year, had felt cold and numb, but there had been no noticeable swelling or wasting. Beyond this there had been no symptoms of any consequence. She was intelligent and fairly cheerful, although naturally discouraged at the steady progress of her trouble. She had no headache or dizziness, slept well, and had no trouble with the sight or hearing. There were no thoracic symptoms: her appetite was good, and, except for some constipation, there was no disturbance of digestion. Menstruation was normal and there were no pelvic symptoms.

Mrs. R. was a well-developed, stout woman, with a scar about four inches long extending upwards in the median line from the pubes. She could move the legs and feet in all directions and with fairly good coördination, but all the movements were slow and weak. There was considerable swaying on standing, especially with the eyes closed. She was unable to walk even for a step or two without support, but with the help of her husband or by taking hold of the furniture she could move about the room. There was considerable hypertonicity of the legs but no wasting. Sensation was diminished for contact, pain, heat and cold from a line about two inches below the umbilicus downwards in front,

and from about the level of the mid-sacrum downwards behind (Fig. 2). The diminution was greater in the right leg, but the upper level of the hypesthesia varied a little from day to day and at times the diminution of the temperature sense could not be made out. The sense of position was fair, but the sense of movement and the localization of sensation were at times defective. There was some tenderness on percussion over the tenth, eleventh and twelfth dorsal vertebræ, but there was no rigidity of the spine.

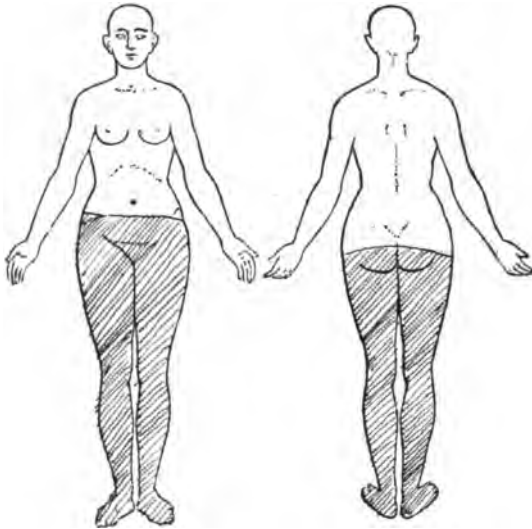


FIG. 2. Shaded region, area of hypesthesia.

The knee jerks were exaggerated, with a patellar and ankle clonus on the right, and occasionally on the left. There were Babinski and Oppenheim reflexes on both sides. There was no Gordon reflex, the Mendel-Bechterew reflex showed dorsal extension of the toes, and the abdominal reflex was absent.

The pupils were equal and reacted normally; the visual field showed no limitation, and the ophthalmoscopic examination was negative. Motion and sensation in the upper part of the body were normal. The pulse was regular and of good strength, the blood pressure was 150 at my first examination, and subsequent tests showed a variation from 125 to 150. Examination of the chest and abdomen revealed nothing. The urine at times showed the slightest possible trace of albumen, with a few round cells and epithelial cells, but at other times it was normal. The temperature was normal. The Wassermann and Noguchi tests were negative. An X-ray examination of the spine revealed nothing. A lumbar puncture was made; the cerebro-spinal fluid was not

under tension, the cell count was 20, and the Wassermann and Noguchi tests on the fluid were negative.

The diagnosis of a tumor involving the posterior surface of the spinal cord at the last dorsal segment was made, and the patient was transferred to the surgical service, where laminectomy was performed on August 16 by Dr. J. C. Hubbard. An incision was made in the back over the lower dorsal and upper lumbar vertebræ and carried down to the bone. The laminæ of the two lower dorsal and the first lumbar vertebræ were removed and on the dorsal surface of the dura, at the upper end of the spinal opening, was a small mass about a third of an inch in diameter and somewhat less in thickness which appeared to be fatty tissue. This was readily removed and the dura opened. When the dura was opened there was a marked bulging of the arachnoid, which was filled with clear fluid. There was no pulsation. The arachnoid was punctured, which allowed the escape of cerebro-spinal fluid, and pulsation appeared. After the excision of the mass the dura was sutured and the wound closed. What was supposed to be a fragment of the mass was sent to the pathologist, who reported that it consisted of blood-clot, muscle, bone and periosteum. The mass itself, before it was excised, was quite distinct and had all the appearance of a tumor, and there was some uncertainty whether the fragment sent to the pathologist was actually a part of this mass.

For the first week after the operation the patient had a little fever, never over 101° F., and a pulse which sometimes rose to 110. She was fairly comfortable and made a good surgical recovery, except that at the end of a week a bed-sore developed on the left buttock. From the fourth day after the operation the sensibility of the legs began to improve.

On August 30 she was transferred back to the neurological service. She then had a bad bed-sore, two and a half inches in diameter and an inch deep. The right knee jerk was increased and there was a spurious clonus, but the left knee jerk was absent. There was a Babinski reflex on the right, but no Oppenheim or Gordon reflex. The legs were stronger and there was less hypesthesia. On September 3 the sensation had improved and she was able to rub the feet together. Micturition was scanty and catheterization was required. On September 7 she was able to stand and take a few steps with support. Sensation was normal except in the left leg. Under faradism and gymnastic exercises she improved steadily. The reflexes were still exaggerated and unequal. The bed-sore healed. Sensation was normal except for some hypesthesia of the feet. She walked about on crutches, gaining strength each day. She had no pain, but the legs were slightly spastic. On October 10 she was discharged.

About a fortnight after leaving the hospital she was able to walk without the crutches and she gained steadily in strength.

She resumed her household duties, doing most of the work for a family of eight except the washing. She came into town from her home in Dorchester shopping, with no one in attendance except her little boy of eight. She went alone, in the cars, to visit her sisters in Quincy and Waverley. She lived, to be sure, on the line of the trolley, but she was able to walk half a mile without help. On one occasion, in the early part of December, she came to the hospital with her husband to see some patient, and my house physician, Dr. Partington, who had had the care of her, reported that she walked out with a normal gait. She also danced with her sister for half an hour, and is said to have danced very well. She had no pain, and felt in excellent health, but there was no return of sexual desire. Early in January, 1913, she took a cold, which was gripe-like in character. After that the legs began to grow weak, heavy and numb, the gait was unsteady and the knees gave way on going down stairs, and there was some aching in the legs. Micturition was somewhat imperative, but there was no incontinence. The bowels were somewhat costive. Locomotion became difficult, so that she wanted someone to help her get about the room, or else she had to take hold of the furniture.

I saw her again on February 2, 1913. She walked with an unsteady gait and had to be helped up from a chair and helped into bed. When in bed it was difficult to turn from the back to the face, and the right leg lagged behind and had to be lifted over the left. She was able, however, to make all the movements of the legs with fair strength. There was no tenderness of the legs. The laminectomy wound had healed perfectly. She could feel the slightest touch everywhere in the legs, but Frey's hair esthesiometer at 0 was a trifle more distinct in the left leg, and thermic sensibility was a little blunted in the feet, which were always cold. The knee jerks were lively, the right being a little greater, the patellar twitch was also greater on the right and there was a front tap contraction on that side alone. The plantar reflex was slight, but of the flexor type. There was no clonus and there were no pathological reflexes in the legs. Muscular tonus was a little increased.

Two weeks later she returned to the hospital, having much more difficulty in locomotion, being able to walk only with support, and having much trouble in rising from a chair. The legs could be moved, but there was much spastic rigidity, the feet being in plantar flexion, the legs extended and the thighs rigidly adducted. The tendon reflexes in the legs were exaggerated, and she had ankle and patellar clonus and Babinski and Oppenheim reflexes. There was some pain at the site of operation. Sensation was blunted to tactile and painful impressions as high as two inches above the umbilicus on the right and the level of the umbilicus on the left. She had a good deal of pain in the back, radiating into the legs, and a sense of pressure at the site of operation.

On March 15 Dr. Hubbard made an incision through the old

scar, extending it a little higher. The tenth dorsal spine was removed and the dura exposed. There was some newly-formed bone and considerable scar tissue at the site of the old operation, but there was no adhesion between the scar and the dura. The cord looked and felt tense, and there was no pulsation. The dura was opened for a length of three inches and an excessive amount of fluid escaped. There were no adhesions between the cord and the dura. The cord looked flattened. There was no obstruction to the passage of a probe in either direction between the cord and the dura. The dura was sutured and the wound closed. She made a good recovery from the operation and was transferred back to my service on March 26.

She improved rapidly and left the hospital April 21. At that time she could walk well with crutches and walk a few steps alone without support. She could move the legs promptly and with fair strength, but there was a little incoördination. The tonus was slightly exaggerated in the right leg, which showed a slight Babinski reflex. There was also a spurious clonus. Sensation was a little diminished in all its forms below a line two inches above the umbilicus, but she could feel the contact of a single hair, although at times she located it on the opposite leg. She could perceive all forms of deep and superficial stimuli about equally well.

[On June 9 she came to the hospital with her husband. She was feeling perfectly well, except that the right leg was still a little weak, and she was apprehensive about going out alone. She walked briskly, with nothing unusual about her gait; rose from a chair and sat down quickly, and got up on the examining table and got down from it easily and without help. All movements of the legs were performed readily and with fair strength. The slightest sensory stimuli were perceived alike on the two legs. Tonus was very slightly increased. The knee jerks were lively and equal, but there was no clonus. The plantar reflexes were normal, and there were no pathological reflexes. On July 21 she came again, feeling extremely well, travelling about the town by herself, and complaining only that the right leg was a little more readily fatigued. Examination showed nothing abnormal in regard to motion, sensation or the reflexes.]

In his great work on diseases of the spinal cord, published in 1874, Leyden, in speaking of the treatment of tumors of the spinal cord, says: "We know no treatment that will arrest the development of a tumor or bring about its absorption. The only remedy would be to extirpate it after trephining the spinal column. Such a procedure lies wholly outside the realm of possibility, just as it does in fractures of the spine." In 1897, having collected fourteen reported cases of operation with nine deaths (64 per cent.),

he and Goldscheider wrote: "Although the number of cases which have been cured or benefited by operation is still small, and although the end has been hastened in more than half the cases, nevertheless an operation is advisable in every case where the local diagnosis can be made with sufficient definiteness." Later experience has given a much more hopeful outlook in favor of operative interference. Stursberg collected 119 operations up to the beginning of 1908, 96 of which were cases of extra-dural or intra-dural growth. Of these 49 were benefited (51 per cent.) and 42 died (44 per cent.). Hildebrand, from his own personal experience, reports even better results. In twenty operative cases only four died, and in two of these the growth could not be removed. This great decrease in operative mortality is largely due to the improvement in surgical technique. This same decrease in operative mortality is shown in the operations at the City Hospital. Before 1906 five cases were operated on with one recovery; since 1909 seven cases have been operated on with one death.

I have not attempted to collect the cases published since the appearance of Stursberg's paper, but I have tried to find how many cases have been operated on in Boston. Fourteen cases have already been reported, and a search of the City Hospital records has shown, as I have stated above, that twelve cases have been operated on there. To the kindness of my various colleagues I am indebted for information concerning many unpublished cases, which are included in the accompanying tables.

	No. of Cases	Im- proved	Not Im- proved	Died	Un- known
Tumor removed.....	11	8	1	2	.....
Tumor partly removed.....	7	3	.....	4	.....
Tumor not removed.....	6	3	2	1	.....
Other lesion found, not tumor.....	6	3	.....	3	.....
Nothing found.....	6	3	.....	2	1
	36	20	3	12	1

I have been able, as these tables show, to collect thirty-six cases in which operations have been performed for the relief of tumors of the spinal cord by the advice of the neurologists in Boston. In only eleven, however, was the growth entirely removed. Eight of these showed more or less marked improvement and only two died as a result of the operation,—a mortality of only eighteen per cent. In seven cases a malignant growth was

Tumor Removed

Reporting Physician	Location	Operation	Result
1. H. C. Baldwin (1, 6).....	5 C-1 D	Extra-dural growth removed.	Marked improvement.
2. I. H. Coriat (2).....	12 D	Exostosis removed from twelfth dorsal vertebra.	Marked improvement.
3. P. C. Knapp.....	7 D	Extra-dural growth removed.	Improvement.
4. P. C. Knapp.....	12 D	Extra-dural growth removed.	Recovery; return of symptoms; second operation; complete recovery.
5. J. J. Putnam (4).....	9 D	Growth removed.	Marked improvement.
6. J. J. Putnam (5).....	5 C-1 D	Growth removed.	Died.
7. F. C. Richardson.....	Dorsal	Growth removed.	No improvement.
8. J. J. Thomas.....	6 D	Extra-dural growth removed.	Died; infection.
9. G. L. Walton (8).....	6 C-1 D	Growth removed.	Marked improvement.
10. G. A. Waterman.....	Dorsal	Growth removed.	Improvement.
11. G. A. Waterman.....	Dorsal	Growth removed.	Improvement.

Tumor Partly Removed

12. W. N. Ballard.....	10 D	Sarcoma, partly removed.	Some improvement.
13. J. W. Courtney.....	5, 6 C	Cancer, partly removed.	Died.
14. J. W. Courtney.....	5, 6 C	Cancer, partly removed.	Died.
15. M. Prince.....	6 D	Malignant growth, partly removed.	Died.
16. J. J. Putnam (5).....	1-3 C	Sarcoma, partly removed.	Considerable improvement.
17. J. J. Putnam (5).....	12 D-2 L	Cancer, partly removed.	Some improvement.
18. J. J. Thomas.....	Cauda	Epithelioma, partly removed.	Died.

Tumor Not Removed

19. P. C. Knapp.....	8 D	Dural growth surrounding cord; not removed.	Improved.
20. J. J. Putnam (4).....	7-9 D	Endothelial growth, not removed.	Some relief.
21. J. J. Thomas.....	6 D	Myeloma of vertebrae, not removed.	No improvement; died of pneumonia.
22. J. J. Thomas (7).....	Dorsal	Myeloma of vertebrae, not removed.	Complete functional recovery.
23. J. J. Thomas.....	Lumbar	Intradural growth, not removed.	Died.
24. G. A. Waterman.....	Dorsal	Malignant growth, not removed.	Not improved.

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Other Lesion Found, Not a Tumor

Reporting Physician	Location	Operation	Result
25. <i>W. N. Bullard</i>	3-6 D	Thickened meninges, removed.	Died.
26. <i>W. N. Bullard</i> (3).....	7 D	Syringomyelia, central gliosis.	Died.
27. <i>W. N. Bullard</i> (3).....	6 D	Circumscribed serous meningitis.	Improved.
28. <i>L. P. O'Donnell</i> (3).....	Lumbar	Circumscribed serous meningitis.	Died.
29. <i>J. J. Thomas</i> (3).....	6-8 D	Circumscribed serous meningitis.	Complete functional recovery.
30. <i>J. J. Thomas</i>	Dorsal	Circumscribed serous meningitis.	Some improvement.

Nothing Found at Operation

31. <i>H. C. Baldwin</i>	Lumbar	Nothing found.	Some improvement.
32. <i>M. Prince</i>	6 C-1 D	Nothing found.	Died; erysipelas.
33. <i>E. W. Taylor</i>	Mid-dorsal	Nothing found.	Relief.
34. <i>E. W. Taylor</i>	Lumbar	Nothing found except arachnites.	Result unknown.
35. <i>J. J. Thomas</i>	Dorsal	Nothing found.	Some improvement.
36. <i>G. L. Walton</i> (8).....	6 C-1 D	Nothing found.	Died.

Cases where the physician's name is in italics were operated on at the Boston City Hospital. Where a number in parentheses follows the physician's name it refers to the corresponding number in the bibliography of cases reported in Boston, where the case has been reported.

found which could be removed only in part. Even in such hopeless cases three were somewhat benefited. Where the growth can not be removed at all naturally nothing can be expected, but a recent case of my own shows some improvement, and Dr. Thomas's case, which he has previously reported, which I saw with him in consultation, made a complete although inexplicable recovery. In the whole thirty-six cases twenty were helped by the operation and twelve died, either as a direct result of the operation or from complications following it,—an operative mortality of thirty-three per cent., which, considering that the tables include both early and recent operations, is fairly satisfactory in comparison with the statistics of Stursberg.

In view of the hopeless outlook for these cases without operation the experience of the Boston neurologists affords further evidence in justification of such operations, even in cases where the growth can not be wholly removed. In my second case the presence of a collection of fluid beneath the dura, when the growth was wholly outside, indicates that in all cases, just as in brain surgery, the dura should be opened.

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PRESENT STATUS OF NEOSALVARSAN IN THE TREATMENT OF PARASYPHILIS OF THE NERVOUS SYSTEM¹

BY EDWARD D. FISHER, M.D.

The results of the studies and work of Ehrlich established that "606" was an effective remedy against the *Spirochæta pallida* and in all acute syphilitic processes produced rapid disappearance of local evidence of the disease.

It was early used, however, in chronic stages of syphilis but did not at first receive the support of Ehrlich himself. The reasons for its non-use were primarily that the later manifestations of syphilis were not directly due to the spirochætæ, which were supposed to have disappeared and were only active in the toxins, and, secondarily, that the arsenic might have a deleterious effect on nerve structure and especially on the optic nerve. Since those early days wider experience in the use of the remedy has been had in regard to dosage and the method of administration; also careful observations by trustworthy clinicians have been made and many of the extravagant claims of its efficiency have been laid to rest, while an assured place of great value in the treatment of the diseases due to syphilis has been established.

Its use, however, has not displaced the older methods of treatment by mercury and potassium iodide, but has found its greatest efficiency in combination with them.

The purpose of this paper, however, is not to discuss that question, but rather the basis of the use, established as it now is, on entirely new laboratory discoveries by Noguchi, Moore, and others, of the spirochætæ in parasyphilitic diseases so-called, *i. e.*, general paresis and tabes. Their presence indicates or proves that cerebrospinal syphilis and parasyphilis as represented by various diseases of the nervous system, as gummatous tumors, cerebral syphilis, tabes, general paresis, etc., are all syphilis, directly due probably to the active effect of the spirochætæ. It is rational,

¹ Read at the thirty-ninth annual meeting of the American Neurological Association, May 5, 6 and 7, 1913.

therefore, to treat all the stages of syphilis persistently and thoroughly until all evidence of syphilis as shown by the reactions in the blood and cerebrospinal fluid by the Wassermann test disappear.

We have thus a gage to go by, indicating when to cease treatment, and on a reëxamination of the blood and spinal fluid when to resume the use of the special treatment.

This approach to almost certainty in the treatment of syphilis seems to me the greatest of the successes of modern medicine and is due to the bringing together of the laboratory and clinical methods of study. They are both dependent one on the other, rarely is or can a laboratory man be a trained or careful clinician and vice versa, but both should have at least a passing or superficial knowledge of the principles and methods of the other. Clinical knowledge is based on anatomy, physiology, pathology, and clinical observations of many years; the last can never be fully understood by the laboratory worker, nor again his studies fully comprehended by the clinician; time does not permit the pursuit of both. The specialist in syphilis is apt to become over-enthusiastic as new methods of treatment arise and is often dogmatic in his claims of cures of what have been considered organic diseases, with definite and well established pathological changes of structure, causing permanent loss of function of the nervous system.

It must not be forgotten that when destruction of the nerve elements has taken place no regeneration can take place, and that therefore there can be no restoration of function. If my last statement is accepted, why should we regard this new treatment as so important? This brings us to the crux of the situation, the great importance of early treatment of syphilis before these losses of nerve structure have taken place, and the importance of confidence in the belief that in this remedy we have the means of destroying the agent which is producing them. Another element for consideration is that probably, not positively, we may at least at all times prevent further advance of the pathological process.

As I have said, in our earlier knowledge of parasymphilitic disease we have distinguished or differentiated it from syphilis of the nervous system by the absence of spirochætæ in the former, thus establishing distinct pathological conditions for each, and consequently distinct clinical entities. While in the

light of our present information this view is no longer tenable, clinically we still have the same classes of disease with which to deal; the first class, as cerebrospinal syphilis, amenable to treatment and often to cure; the latter, incurable, although more amenable to improvement or control.

Possibly early treatment of syphilis by this new remedy may prevent these later manifestations, but certainty in regard to this must await years, ten or twenty, before a decision can be obtained. Our experience with the old mercury and potassium iodide treatment demonstrates this positively, as experience has shown under it an apparent disappearance of all clinical signs of disease, with its reappearance in ten or twenty years in the later forms of disease of the nervous system, as tabes or general paresis.

No matter how thorough or continuous the early treatment then has been, no positive assurance is possible that later manifestation may not occur. All who have had twenty-five years of practical experience in medicine in this department recall many such cases.

In the early years of "606" I opposed its use or was at least skeptical of its efficiency in parasyphilis. In the past year I have used it or "914" in many instances, and, now, with the known presence of the spirochætæ in these conditions, believe it is the only treatment in combination with the older method.

I do not look for cure of the later stage of syphilis, but have found relief of many clinical manifestations and seen a stay in the further progress of the disease.

ANTERIOR CRURAL NEURITIS

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ANATOMY OF THE ANTERIOR CRURAL NERVE

(Continued from p. 778)

Of the remaining cases, one is referred to by Oppenheim in the 1908 edition of his text-book, as occurring in a young man whose father was a diabetic, although in the patient no etiological factor could be found. Waterhouse reports more fully the next case. The patient was a laborer who had never been ill before. He suddenly complained of pain over the dorsum ilii and upon the front of the left thigh, extending as far as the knee. The condition had lasted three months, and at the time of examination, there were muscular wasting, diminished knee jerk, and weakness. Sensation was normal. No causative factor could be found, and there had been no undue exposure. The history and examination of the single case which has come within my personal experience will be given in another section.

Summary and Tabulation of Recorded Cases

From a review of the literature I find there are, including my personal observations, 136 instances in which the femoral nerve, of one or both sides, has been the seat of an inflammatory process originating from some internal or medical disorder.

The etiology has been varied, in many cases questionable, and, in a few instances, not determined. The disease has been observed eighty-four times as a post-partem complication, once as a congenital affection, eight times as a primary condition, and three instances have been referred to which I have been unable to verify (Turney, Riegel and Auché). The remaining forty cases are distributed among fifteen different disorders. In a few instances the inflammation has extended to adjacent nerves, but in each case the most pronounced symptoms have been confined to the femoral distribution.

The accompanying chart, arranged according to the various conditions in which the disease has been observed, illustrates the relative frequency with which one or both nerves have been affected; and, when unilateral, the frequency with which the right and left sides were involved. In the bilateral affections, the figures under Rt. and Lt. indicate the number of cases in which the disease made its appearance first upon the right or left side.

Etiological Factors	No. Cases	Unilateral			No. Cases	Bilateral			No. Cases	Affected Side not Mentioned
		Rt.	Lt.	Not Given		Rt.	Lt.	Not Given		
Diabetes.....	10	3	2	—	5	3	1	1	5	—
Gout.....	2	—	1	—	1	—	—	—	—	1
Rheumatism....	1	—	—	—	—	1	—	—	1	—
Exposure.....	5	2	2	—	4	—	—	—	—	1
No cause.....	8	1	4	2	7	—	—	—	—	1 including author's
Overexertion ...	1	—	—	—	—	—	—	—	—	1
Occupation.....	3	2	1	—	3	—	—	—	—	—
Liver abscess...	1	—	—	—	—	—	—	1	1	—
Appendicitis....	6	5	—	—	5	1	—	—	1	— including author's
Typhoid fever..	2	1	1	—	2	—	—	—	—	—
Syphilis.....	1	1	—	—	1	—	—	—	—	—
Tuberculosis...	1	1	—	—	1	—	—	—	—	—
Alcohol.....	2	—	1	—	1	—	1	—	1	—
Narcosis.....	3	1	2	—	3	—	—	—	—	—
Pentosuria.....	1	—	—	—	—	—	—	1	1	—
Osteomalacia...	1	—	—	—	—	—	—	1	1	—
Congenital.....	1	—	—	—	—	—	—	—	—	1
Total.....	49	17	14	2	33	5	2	4	11	5
Unverified.....	3	—	—	—	—	—	—	—	—	—
Obstetrical.....	84	—	—	—	—	—	—	—	—	—
	136	—	—	—	—	—	—	—	—	—

Exclusive of the obstetrical cases and the three unverified cases, there are 49 instances of femoral neuritis which have been studied with sufficient care to be instructive. Of these, there are 33 cases in which the disease was unilateral; 11 in which both sides were affected; and 5 in which the affected side was not mentioned. In the unilateral cases, the right nerve was involved 17 times; the left 14 times; and in two cases the affected side was not stated. Of the bilateral cases, the initial symptoms appeared first upon the right side in 5 instances; upon the left in two cases; and not indicated in four. If the bilateral cases be regarded as transitory unilateral affections according to the side first

affected, and are added to the distinctly unilateral conditions, there are, in a total of 38 cases, 22 instances in which the right side was affected and 16 in which the initial symptoms were upon the left side.

If, in the preceding chart, the following are included under "no cause":

No cause	8
Rheumatism	1
Exposure	5
Overexertion	1
Occupation	3

there is a total of 18 cases in which the condition may be regarded as "primary" or "idiopathic." In these 18 cases, the disease was unilateral 14 times; bilateral once; and not stated in three instances. Of the 14 unilateral cases, the right side was affected five times, the left side seven times, and unmentioned in two cases. In the one bilateral condition the right side was first involved, and if this be added to the five distinctly unilateral cases, the two sides are about equally affected.

CLINICAL MANIFESTATIONS

Anterior crural neuritis, consequent upon internal or medical disorders, is an affection of the peripheral nerve or its branches similar to that observed in other local and general neuritic conditions, and is characterized by pain, tenderness along the course of the nerve trunk, and weakness of the affected muscles. Sensory and trophic disturbances may or may not be present.

Age.—The disease is chiefly met with in middle-aged and elderly people. One case, however, has been described in a child seven years of age. By far, the greatest number of cases have occurred between the ages of fifty and sixty. From the second to the third decade, and also from the fourth to the fifth decade there are a number of well-recognized cases. It is especially an affection of early adult and middle life—23 of the 29 cases in which the age was stated having occurred between the ages of twenty and sixty, with a slightly greater number in the fifth decade.

Sex.—Of the 33 cases in which sex was indicated, 25 were in males and 8 in females, which gives a proportion of about 3 to 1. If there are excluded from this number the three cases occurring

in women who, on account of some gynecological condition, were forced to assume an operative position favorable to an affection of the lumbar nerves, the percentage of cases in the male is even higher. Necessarily, because of the combination of doubtful factors and the impossibility of such a combination in the male, the 84 obstetrical cases have been excluded from this estimation of the relative frequency with which the two sexes are affected. This greater predominance in the male, whose activities subject him more continuously to the extremes of temperature and climatic conditions, would indicate that there may be some foundation for the belief in exposure as a predisposing etiological factor.

Symptoms.—The onset of the disease may be acute or subacute. Usually there is pain of an intermittent character for several days, or even weeks, before the characteristic symptoms make their appearance. In some cases the onset may be preceded by a feeling of weakness in the muscles of the thigh, or the complaint may be that of a "peculiar feeling" to the skin over this area. By far, the commonest and earliest symptom is pain in the distribution of the crural nerve or one of its neighboring branches. For some time, it may be only an occasional "stab" of pain about the knee, on the front of the thigh, or about the ankle. After an interval of several days it reappears, spontaneously or following a sudden or excessive movement of the trunk or thigh, such as stooping to lace a shoe, going up and down stairs, or upon arising from the reclining posture. In the course of a week, or even a month, if the onset be subacute, the pain becomes more persistent, of wider distribution, greater intensity, and of a continuous paroxysmal nature with nocturnal exacerbations. The patient usually, then, seeks the bed and the disease may be said to have become fully established.

The character, location, and extent of the pain are quite distinctive. In fact, in my personal observations, the manner in which the patient located the site of the pain was just a little different from what I had previously observed in painful affections of the peripheral nerves. The most striking feature was the rather indefinite and vague effort which was made to outline its exact location and distribution. The patient placed the palm of the hand over the upper part of the groin and then swept it downward, along the inner side of the thigh to the knee, on its inner

aspect. Here, it was retained for a few seconds, and then rubbed in a rotary manner over the entire knee, always beginning on its inner side and then passing upward and outward to a point just above the patella, and then downward to the spot from whence it started. The hand was then swept downward, along the inner aspect of the leg, to a point just above the inner malleolus, where the entire leg was firmly grasped between the two hands. I was not aware, at the time, that Waterhouse had already emphasized this peculiarity with which these patients indicate the seat of pain. He remarks that the manner in which the patient indicated the site of the pain is very characteristic; "he first places the palm of the hand over the front of the iliac crest and then sweeps it down over the front of the thigh." There is, then, considerable difference between the manner in which pain, in the crural distribution, is indicated, from that following the course of the sciatic nerve, where the pain is so limited that its distribution may be outlined with the finger. Perhaps the more superficial distribution and early branching of the femoral nerve may account for this difference.

Other sensory changes, particularly those of a destructive character, are rather uncommon in association with crural neuritis. I have found only one case, that of Jeanselme, in which there was definite loss of sensation. He describes a band of total anesthesia along the front of the tibia, with a zone of hyperesthesia on the front of the thigh extending from the knee to the groin. In most cases there is merely a diminution of sensation, or no disturbances other than pain and paresthesia. Opinion is somewhat divided, however, upon this point. Gowers, in writing of diseases of the lumbar and sacral plexuses, says: "The symptoms are chiefly sensory when limited to the anterior crural distribution"; while Waterhouse emphasizes, particularly, that he is to describe a condition which "is characterized by wasting and by loss of power, not amounting to complete paralysis, in the muscles of the front and inner side of the thigh, together with a complete absence of sensory changes except pain." No doubt there may be two types of the condition dependent upon the severity with which the sensory or motor fibers are affected; the greatest number of cases, however, have shown only the mildest sensory changes. Vasomotor and trophic changes have also been described—there may be edema about the knee or ankle, and the affected side may be

cooler to the examining hand than the sound side, or in some cases the surface temperature may be slightly elevated. Herpes has also been described as a rare complication.

Except in the mildest cases there is always some motor disturbance. Weakness and "giving way" of the knee are common complaints, and there is some difficulty in raising the leg from the bed when the knee is fixed. There is usually moderate wasting of the muscles on the front of the thigh, though it rarely proceeds to a marked degree, and not infrequently is confined to one or two muscles or a portion of a muscle. In some instances there is definite diminution in the size of the two extremities. The ileopsoas and the adductors of the thigh are frequently involved when the seat of the pathological condition is sufficiently high to implicate the fibers to the psoas, or to affect the obturator nerve.

The superficial reflexes, epigastric and abdominal, may or may not be altered. They have been described as absent in a few cases. The knee jerks are nearly always altered. In the mild cases there is merely a diminution of the tendon reflex upon the affected side, while, if the condition is at all severe, the knee kick is invariably lost, and is said not to return. The tendon of Achilles jerk and plantar stimulation have been present and of normal response in all the recorded cases.

Slight electrical changes are usually to be found in the muscles of the affected side. In the majority of cases, the changes are mostly quantitative and not of the same degree in all of the muscles. In the severest cases, the reaction of degeneration is usually found, although it may be unevenly distributed, as, for example, the quadriceps extensor cruris muscle, which is composed of four distinct parts, may show every variety of electrical response in its several parts, or the response may be entirely normal in all of them except one.

PERSONAL OBSERVATIONS

Idiopathic Femoral Neuritis.—The patient, a married woman, 39 years of age, was referred to me by Dr. L. P. Hamburger on May 24, 1912.

The family and personal histories are negative for gout, rheumatism, diabetes, and nephritis, but there is a marked neurotic element throughout the entire family. The patient has always en-

joyed the best of health and, until the present illness, has not been ill in bed for a number of years, nor has there been any recent infectious or constitutional disorder. The marital history is entirely negative. She has never given birth to any children, nor have there been any miscarriages. There is no evidence of specific disease or its consequences.

The present illness began about 9 weeks ago (March 20) while on a visit to Atlantic City, where she had been spending most of the early spring. The first symptom was a dull aching pain about the left knee joint (the patient places the hand over the patella) which would continue for ten or fifteen minutes, and was not severe enough to interfere with walking. This continued for a few days and then ceased altogether for three or four weeks, except that during this interval she would experience an occasional pain about the knee when stooping to tie the shoe.

Upon returning to Baltimore, in the early part of May the attacks of pain began to increase in frequency and severity, and at this time were located about the left knee, on the front of the thigh above the knee, and on the inner side of the leg as far as the ankle. The pain was of a dull boring character and the ankle felt "as if it were in a vise." In locating the course of the pain, the patient places the palm of the hand over the inner and anterior surface of the thigh, along the inner side of the knee, and about the ankle.

There has never been any numbness or tingling in the leg, nor any marked difficulty in going up or down stairs, although this movement invariably increased the pain. There has not been any loss of sphincter control, although, at times, micturition has been rather more frequent than is customary. (Dr. Hamburger tells me that this has been a characteristic complaint for many years.)

Examination.—Thorough and repeated physical examinations were made by Dr. Hamburger, who, at no time, found anything abnormal in the thorax or abdomen. The temperature remained normal throughout the illness, and repeated examinations of the blood and urine failed to show anything pathological. Dr. W. H. Baer was then asked to make an examination of the articulations and bones of the trunk and lower extremity, but could find nothing to account for the symptoms.

A thorough pelvic examination was made by Drs. Russell and Casler, who reported the findings to be negative. The latter

thought he could feel a slight mass in the left pelvic region, but did not consider it definite enough to justify a positive conclusion or suggest an etiological relation.

When I visited the patient a few weeks later, in the ninth of her illness, she was lying in bed, with the left leg in a semi-flexed position and complaining of great pain in this extremity. The distribution of the pain and the peculiar manner in which she attempted to locate it have already been described, and I shall proceed directly to the neurological examination.

The Cranial Nerves.—Nothing abnormal was to be detected in any of the cranial nerves, and the ophthalmoscopic examination was entirely negative in a pathological sense.

Station and Gait.—In walking, the left leg is somewhat rigid and the gait is slightly limping. There is no toe-drop or foot-drop, but the left leg is put forward slowly and deliberately because of the pain, which this movement induces. Station with the eyes closed is well maintained and there is no evidence of ataxia.

Motility.—The left leg can be moved in all normal directions, with limitations in movements from the hip. For example, flexion of the thigh on the abdomen with the knee fixed, can be performed, but the movement is slow and deliberate, and causes great pain. The patient says the leg "feels heavy" when she attempts to lift it from the bed. Resistance to passive movements is definitely diminished in the extensor muscles of the thigh. Abduction and adduction can be performed, with slight limitation of movement in the adductors, which is demonstrated in diminished resistance to passive movements, and in attempting to cross the left leg upon the right. Rotation is well performed and all movements below the knee are executed in a normal manner.

Reflexes.—The biceps and triceps tendon jerks are easily obtained upon the two sides and are of equal intensity. The epigastric and abdominal reflexes are obtained upon each side, and are equally active. Both knee jerks are present, but the left is greatly diminished and obtained with difficulty only after reinforcement and upon repeated efforts. The tendon Achilles jerks are present and of equal intensity upon the two sides. Plantar stimulation and descending tibial irritation produce plantar flexion of the great toe of each foot.

Ataxia and Postural Sense.—There is no evidence of ataxia

in either the upper or lower extremities, and all passive movements of the toes, ankle, and leg are accurately reproduced by the patient.

Sensory Examination.—There are no gross sensory disturbances upon any part of the cutaneous surface. There is, however, on the front and inner aspect of the left thigh and leg a small area of hyperesthesia to tactile and painful stimuli, and slightly impaired thermal sensibility. This sensory disturbance, however, does not follow a segmental distribution nor does it conform entirely to the distribution of any particular cutaneous nerve.

Painful Points.—There is marked tenderness when the muscles of the left thigh and calf are kneaded, and there is some tenderness upon deep pressure over the sciatic nerve, particularly in its peroneal branch. The pain, however, is nothing like that elicited when deep pressure is made upon the femoral nerve as it emerges from beneath the ligamentum inguinale. If the patient lie upon the abdomen, and at the same time, have the left leg strongly extended at the hip, excessive pain is produced in the crural distribution. In fact, the slight tension produced upon the anterior thigh muscles in assuming this attitude, causes marked discomfort on the front of the thigh and at the knee. There has never been any pain in the right leg.

Electrical Examination.—The sciatic, anterior crural, tibial, and peroneal nerves, and the muscles supplied by them, respond to faradic and galvanic stimulation. The left vastus medialis, rectus femoris, and sartorius muscles, however, show decreased irritability to both forms of current, and the response to galvanic stimulation, though slightly tardy, is not definitely of the degenerative type.

Diagnosis.—With the exclusion of trauma, vertebral disease, psoas abscess, intra-abdominal and pelvic inflammatory conditions, diabetes, nephritis, bone and joint affections, toxic states, anemia, infectious disease, and in the absence of positive X-ray findings, the differential diagnosis lay among the following conditions: intraspinal tumor, meningeal disease, intramedullary disorders, atypical poliomyelitis, and anterior crural neuritis of obscure origin. Elimination of these several conditions was not a simple task, and while it was difficult to make a positive statement at the time, the subsequent history confirms my belief, then

expressed, in favor of anterior crural neuritis. Within a few weeks there was definite improvement, which continued on to complete recovery, and a recent report informs me that the patient is still enjoying the best of health.

When there is some visible or tangible cause for the presence of neuritic symptoms in the distribution of a peripheral nerve, the diagnosis is comparatively simple and there is little hesitancy in expressing an opinion in favor of secondary neuritis. Thus, in the second case, which I shall relate very briefly, the diagnosis offered little difficulty, and I record it simply as an additional case of

Appendicular Neuritis.—The patient was a young unmarried woman, 24 years of age, who complained of pain in the right groin, and along the front of the thigh, and slight weakness in the leg when going up stairs.

The only noteworthy feature of the family history is the fact that one paternal uncle had died of diabetes. There is a personal history of repeated attacks of "grippe"; the last, about one year ago, and one year previous to this there was an attack of double pleurisy, which confined her in bed for about two months. During the two years following the pleurisy, there were several attacks of intense pain in the right lower abdomen, accompanied by slight nausea, and moderate rise of temperature, and the intervals between acute attacks were more or less uncomfortable because of frequent pain in the right side upon the slightest unaccustomed exercise.

The patient was referred to me by Dr. T. Chew Worthington, because of the pain and weakness in the right leg, which made their appearance about the time of the first acute symptoms in the right inguinal region.

Examination revealed definite tenderness upon deep pressure over McBurney's point, and the appendix could be definitely palpated. Pressure upon the right femoral nerve, below Pupart's ligament, produced severe pain which radiated for some distance along the front of the thigh. The distribution of the middle and internal cutaneous nerves was slightly hypersensitive to tactile and painful stimuli, and the anterior femoral muscles were slightly weaker than those of the left side. The electrical examination did not demonstrate the reaction of degeneration. Both knee jerks were present and easily elicited.

A consultation with Dr. Finney confirmed my suspicions of appendicitis, but his suggestion of an operation was not accepted by the patient, and I am not familiar with the subsequent history.

CONCLUSIONS

1. The statement that anterior crural neuritis is among the rarest nerve affections is not supported by facts. Although 136 cases are not sufficient to class it among the common disorders, I believe there are many more instances which have either not been recognized, or have been thought to merit no further consideration.
2. As a secondary neuritis, it has been observed in many conditions which are of interest to the internist, the gynecologist, the obstetrician, and the surgeon.
3. Although extremely rare as a primary or idiopathic affection, the recognition of its occurrence as such may be helpful in differentiating some otherwise obscure disorders of the lumbar nerves.
4. It is hoped that this study may encourage further interest in femoral nerve affections and stimulate others to record observations of similar cases, so that, finally, a more accurate knowledge of its frequency may be obtained.

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Society Proceedings

AMERICAN NEUROLOGICAL ASSOCIATION

THIRTY-NINTH ANNUAL MEETING, HELD IN WASHINGTON, MAY 5, 6,
AND 7, 1913

The President, DR. PEARCE BAILEY, in the Chair.

(Continued from page 799)

Dr. John H. W. Rhein, Philadelphia, read a paper entitled, "Cerebral Palsies Without Demonstrable Anatomical Findings."

A paper entitled, "The Value of X-Ray Analysis of the Gastro-Intestinal Tract in Some Types of So-Called Functional Nervous Disorders," was presented by Dr. L. Pierce Clark and Dr. Archibald H. Busby, of New York City.

Dr. Cramer, of Cincinnati, asked whether any of these cases had been treated surgically.

Dr. L. Pierce Clark, New York, stated that none had as yet been surgically treated.

Dr. D. J. McCarthy, Philadelphia, said that he could support what Dr. Clark and Dr. Busby had said in their paper from an extensive study of the past year on not only this group of cases (epilepsy), but practically the entire group of functional cases that come to the neurologist's office. Wherever there has been suspicion of gastrointestinal involvement, or intestinal toxemia, the speaker has had X-ray studies made, in his own office, which is provided with the X-ray equipment. The percentage of cases of what has been considered the purely functional neuroses—where one gets lesions not only equal to those shown in Dr. Clark and Dr. Busby's group of cases, but even more intense—is surprising. This includes not only what has been termed the neurasthenic group, but cases of mental disease and the general fatigue neuroses group.

In some of these cases corrective measures have been used; these measures having been in the hands of Dr. Beyea, who Dr. McCarthy thought had been the first to institute the suspension operation for gastroptosis. During the period of the speaker's membership in this association we have been gradually eliminating the disease called neurasthenia; and year by year one group has disappeared. Dr. McCarthy believes that most of us have come to the conclusion, from a study of what has been termed simple neurasthenia, that it is not purely functional and depends as a rule upon some physical basis. He does not mean to assert that conditions of exhaustion of the nervous system cannot occur, but that in the absence of an organic basis they recuperate very promptly through simple rest, and where for any extended time a condition of neurasthenia exists, we must look for a physical basis therefor. He does not see how we can come to any final conclusion in this group of cases without a study of the gastrointestinal tract. The diagnostician cannot determine the posi-

tion and state of the stomach, or of the colon, without X-ray studies; and in these cases he believes it incumbent on the practitioner to make such studies in order to arrive at a working diagnosis. Among those cases operated on where they have been well selected, uniformly excellent results have been obtained; certainly this has been true in neurasthenia, the hysterical group of cases, and such cases where the patient was put on a preliminary treatment and prepared for operation; though he cannot say as much for cases referred to him where these operations have been performed by the surgeon without previous consultation with the neurologist, for the reason that the cases had very often been operated on at an inopportune time, where the patient was in extremely bad condition for operation.

Dr. C. B. Burr, Oak Grove Hospital, Flint, Mich., wished, in connection with this thoughtful paper, to mention noteworthy work of Dr. Longyear, of Detroit, in connection with nervous conditions. Dr. Longyear having made an especial study of dropped kidney and finding in connection with this the cause of visceroptosis of different organs, the colon especially. It was not given to every man to make a discovery in anatomy, but Dr. Longyear claims to have made a discovery (and the claim has not been successfully questioned, to the speaker's knowledge) of a ligament connecting the lower pole of the kidney with the colon. The rectification of the kidney displacement lifts up the colon, improves the condition of digestion, relieves malnutrition and antitoxins which Dr. Longyear regards the underlying cause of the nervous symptoms. Dr. Burr had had one manic-depressive case where operation was followed by very rapid improvement and recovery and, while not meaning to say that surgery was the only factor in the case, averred that it was an important one. He had under his care one case of epilepsy and in that case also, after kidney suspension and incidental colon suspension, there was marked improvement. Dr. Burr concluded by saying that Dr. Longyear reports of the latter case that the seizures are very much further apart, and the character of them lighter.

Dr. Herman H. Hoppe, Cincinnati, thought this was a study of the relation between visceroptoses. These relations undoubtedly exist, and in a very large number of cases; and the question arises as to what is the causative relation between the two. Dr. C. A. L. Reed, of Cincinnati, had done a great number of operations on coloptosis. In many of these neurasthenic conditions there had been some improvement; in a number of them the relief had been marked; in a great number of them there had been no results at all. In a number of the cases, when the X-ray application was dropped, after the lapse of six or eight months there was a complete coloptosis again. Dr. Hoppe therefore believes that while the study of this condition was very interesting, before the profession can come to any conclusion as to the therapeutic results a larger number of cases must be studied. There was, on the part of a great many patients, an objection against having an operation of a serious character done for a primary condition that had existed for a long time. Most of the patients refuse after a while to wear the porous pads that have been advised for keeping the colon and the stomach in place. Some practitioners have found the straight front corset to answer nearly all the purposes except that of an operation. It compresses the hypogastric region and allows the loose organs to play into the cross-section, releasing the mechanical kinks produced by pressure. One brilliant case of epilepsy occurred to the speaker as presenting complete recovery following operation. A young man

had continually psychical equivalents, with an occasional attack of petit mal; but in the whole course of five or six years only one or two attacks of grand mal. The case was one of a lesion on the right side, the lesion having enlarged until it attained the size of a pig's head. The man never had any medicine of any character before or after the operation. It is two years since the performance of the operation, and absolutely no recurrence of attacks in this time has occurred, showing that as far as concerns this individual case there was a direct relation between the stomach and the recurrence of epileptic seizures.

Dr. H. W. Longyear, Detroit, Mich., said that his experience in the treatment of coloptosis in connection with epilepsy had been limited. As Dr. Burr mentioned, he and the speaker had had one case together; but beyond that, the latter's experience with that kind of nervous difficulty did not extend, he having treated, however, a great many cases with other kinds of psychic manifestations. He wished, however, to congratulate the society in taking up this matter. It was only one argument which showed that the psychiatrist must first be an internist, and a good diagnostician in all that relates to the human anatomy; and the fact of the consideration of this subject upon the program appealed to him as a distinct advance. So far as his information went, he believed that the one who had done more in this matter of the relation of ptoses to psychic disturbance was Dr. Billington, of Birmingham, England, who had studied the relationship of dropped kidney to insanity, and published a brochure on the subject. Dr. Billington found a very large percentage of those women under his care troubled with nervous manifestations have dropped kidney. As intimated by Dr. Burr, the speaker's studies have been in relation to the dropped kidney and colon, and his idea is this: that the pathology of the two troubles go together. There is a connection between the kidney and the colon which the speaker has termed the nephrocolic ligament: not a ligamentous structure, technically, but an aggregation of fasciculi formed of the filamentous framework of the fatty capsule which passes around the kidney and then downward, and is inserted into the ascending colon on the right side and the descending colon on the left side. Now, then, when the cecal end of the colon drops, because of laxity of the hepatocolic ligament, the weight practically comes on the kidney; because there are only two attachments possible holding up the bowel from that side, *viz.*, the hepatocolic ligament and the nephrocolic ligament. If the nephrocolic ligament is taut and strong and the kidney well anchored, you will not have the colon descend on the right side, even if your hepatocolic ligament is wanting; but with a loosely attached kidney and a wanting hepatocolic ligament (and Gray tells us that the hepatocolic ligament is frequently wanting, or very slight), then you will have this drop. Now, on the left side the phrenocolic ligament is strong, and Gray tells us, hardly ever wanting in any way; consequently, we have the dropping of the right side so much more frequently than the left. The weight of the cecum and the muscular action necessary to force material past the angulations facilitates the right-side displacement, whereas, on the other side, the contents of the colon pass downward, avoiding such traction, so that the left kidney is very rarely displaced. This, in brief, is the etiology originally advanced by the speaker. A glance at the pathology suffices to convince anyone that these displacements may profoundly affect the nervous system. The intestinal toxemia resulting from the colonic angulations and fecal stasis is especially to be considered. The speaker mentioned a simple operation devised by himself by which the

nephrocolic ligament is fastened in the loin and made to suspend both kidney and colon. He called attention to another class of cases, beautifully shown by some of the X-rays of the essayist; that is, where there is present a very redundant transverse colon filling the pelvis, perhaps with adhesions, in which this operation will benefit but little. In those cases open the abdomen and suspend this transverse colon by button-holing small portions of the gastrocolic omentum, two inches apart, and about two inches above the colon, into the peritoneum and subperitoneal aponeuroses, transversely across the abdomen above the navel. From three to four such attachments of the colon will relieve all of that drag upon the two sides of the gut. The speaker believes the angulations caused by the low dropping of the colon cause the greatest symptomatology in these cases. The operation relieves that atonic condition of the colon, which has largely to do with the nervous symptoms. By such operative procedures one can do a great deal toward permanent cure. A properly fitting band or support is also of very great use, one, preferably, which can be used in thin subjects. One of the discussers spoke of the corset, which is all right, if the patient be fat enough to make a pad of adipose sufficient to hold up the belly; but these patients are not fat; they are thin from malnutrition. Some of them are emaciated; and their pelvic bones stand out like the sides of a wheelbarrow. One has to get around inside of these projections to hold up the abdomen, which cannot be done by any corset. Consequently, any mechanical appliance to be of practical use must be something that fits around those hip bones and presses inward, giving an upward support. The speaker's supporter was simply a band of fabric with a truss attachment, made of flexible nickel-brass, so that it can be bent to fit each person. The supporter must be made to fit each person by careful measurement and adjustment. You cannot get such appliances made commercially, by the dozen, to fit everybody and have them efficient. You must measure them and have this very thin brass arrangement made to fit accurately, so that it will not interfere with the outer clothing in any way; and this will make this upward, positive support. Now, as to medication, attack the *cause* and not the symptoms. Avoid cathartics, use lubricants, oil enemas, and do everything to relieve the spasticity of the gut and correct the toxemia. That spastic condition of the gut, which comes from an inability to force material over the angulations, must be relieved by soothing treatment. The gut often becomes distended more and more, until it is of enormous size. You must stop all kinds of active cathartics and the medicines which will cause violent peristalsis, and lubricate the bowel. The speaker has used a thick petrolatum oil, which is one of the best lubricants available. It is a paraffin, that passes through the alimentary canal without digestion, and simply acts mechanically. The speaker has also used agar agar, which divides the stool, makes it more friable, and prevents hardness. The speaker believes that surgery is necessary to effect a cure of many of these cases, but that it is only one of the agents necessary. Without resort to the knife very much can also be accomplished by the mechanical and medicinal measures suggested.

Dr. J. W. McConnell, Philadelphia, speaking, as had some of the other discussers, from the internist's side, declared himself uninterested in the surgical side, believing that internal medicine and internal therapeutics have not been sufficiently investigated. There was too much tendency to go ahead and cut. For several years the speaker has been working very carefully at the condition of displacement of the abdominal

organs, with direct reference to its effect upon the nervous system, and incidentally upon the general digestion, and would like Dr. Clark, in closing the discussion, to recapitulate, if possible, the analysis of the stomach contents, whether that has been studied in these cases. The variation in the different conditions of ptoses seems to the speaker to have some relation to the general physical condition of the patient. In the matter of treatment of these cases he has largely been following the suggestions of Kampe and Rosewater; that is, of abdominal supports. Going a little further than has been suggested in their books, he puts the patients upon an operating table which he can throw into the Trendelenburg position; then he applies the Rosewater bandage, made of very heavy adhesive plaster, moleskin plaster, having had, up to the present time, certainly 300 or more cases in which there had been very distinct relief of the gastrointestinal symptoms, noticing, also, in the course of 25 hours, a very definite improvement in the peculiar toxic condition into which those patients naturally fall. The speaker felt that the work of Dr. Clark and Busby was remarkable and sincerely hoped they would continue it and give it further report.

Dr. Charles A. L. Reed, Cincinnati, said that he deemed it a privilege to address the American Neurological Association, and only regretted his lack of previous knowledge of the title of Drs. Clark and Busby's paper, that he might have been present to have heard the paper more fully. On the general proposition of the relationship between visceroptosis and nervous disease, the speaker would not pretend to speak with any great degree of accuracy. Having had a number of these cases referred to him by noted neurologists in Cincinnati, notably by Dr. Hoppe and by Dr. Langdon, he had some very satisfactory results following surgical restoration of these displacements. Dr. Reed believed that a local displacement was a persistent condition and that it was no more possible to reduce or to counteract that displacement by medicines than it is to reduce a dislocated elbow with a dose of pills. A definite case of coloptosis, or a pronounced gastroptosis is there until surgically restored. In every case the obstruction, the intestinal stasis, is there until the normal condition of the stomach and colon is restored. Now, with reference to the alternative treatment with bandages, trusses and so on, the speaker has not infrequently applied them; sometimes with benefit, temporary benefit, partial benefit. But that that treatment can by any possibility restore the intestines to normal position is something not for a moment believable. In other words, the speaker, having found it practically impossible to hold up these intestines with his hand on the inside of the abdominal cavity, does not know how it is going to be done by pressure on the outside. The intestines are the most elusive structures within his knowledge. The endeavor to hold them up by a bandage that impinges simply upon the abdominal wall in front of the lower zone of the abdominal cavity contemplates a degree of pressure that, to force the displaced intestines into normal position, is absolutely impossible as a practical measure. But that there is a certain restriction of mobility, and, consequently a certain amount of comfort realized from these abdominal supports, is beyond dispute. And that patients can thus be made relatively comfortable with a certain amount of improvement in cases in which the toxicity is not very pronounced, or in which the displacement is not very pronounced, is beyond question. It ought always to be tried, and if a patient can in that way be made comfortable, by all means continue it. One rule stated by the last speaker on the floor ought always to be observed, namely, to apply these trusses

under the Trendelenburg position. Dr. Reed was very much interested in the question and glad to know that it has been taken up by neurologists. The results in Cincinnati have been exceedingly satisfactory. In a very considerable number of cases he has had no deaths and there ought to be no mortality following surgical restoration of the stomach and colon in uncomplicated cases. The speaker and his colleagues of that city have not experienced mortality from that operation, the results having been permanent in more than 85 per cent. of their cases, with improvement in some others, and with less than two per cent. of failures, that is to say, cases where there is no improvement at all. The first improvement noticeable in his cases is restoration of bowel function, by which is meant the disappearance of the intestinal stasis. This may occur within a few days, or it may not be fully realized for several weeks. It may or may not require supplementary treatment. Then follows a rapid disappearance of the toxic symptoms so generally embraced under the term neurasthenia. This has been observed in several striking instances following operations done by the speaker in cases that had been referred by Dr. Hoppe. The milder psychoses seemed to go the same way as was observed in a gratifying way in a case of simple melancholia that had been referred by Dr. Langdon. With the disappearance of neuro-psychic symptoms of toxemia, there is an almost revolutionary improvement in nutrition. The speaker had had numerous cases in which from fifteen to fifty pounds of weight had been taken on in a surprisingly short time. In a case referred by Dr. J. E. Greiwe, the improvement had amounted to something over sixty pounds. The success of the treatment depends upon faithful fidelity to the details of technique.

Dr. Edward B. Angell, Rochester, N. Y., mentioned, as one point not yet brought out in the discussion, that as soon as the intestinal fermentation that distends the bowel and causes the pressure is corrected, permanent relief will be afforded the patient without using the support. He has many times had the pleasure of taking off these supports, leaving the patient much more comfortable; and, in a number of the cases, he succeeded in preventing the intestinal fermentation that is a frequent cause, at least, of these troublesome conditions.

Dr. L. Pierce Clark, New York City, speaking for himself and his co-worker, Dr. Busby, stated that a number of different types of nervous disorders of the neurasthenic group had been under observation but that they thought best to limit the work to a small group of epileptics very definitely studied. In this way the neurologist might properly estimate the value of such analysis, especially when studied by the neurologist and internist together for a fairly long period of time. He thought the physiologic and hygienic correction would ultimately prove the correct treatment, and not surgery. Even Lane seems less anxious to induce corrections by operative means.

Dr. Theodore Diller, Pittsburgh, read a paper entitled, "Some Difficulties in Diagnosis of Brain Tumor."

The communication of Dr. Frank R. Fry, St. Louis, entitled, "Rebounding Pupils," was read by title, in the absence of the author.

Dr. Alfred Gordon read a paper entitled, "Experimental Study of Intraneural Injections of Alcohol."

Dr. Israel Strauss, New York, said that he could in a way bear witness in confirmation of Dr. Gordon's results. About two years ago he saw a patient into whose sciatic nerve there had been an injection of

alcohol (probably 80 per cent.), the result of which injection was a complete paralysis of the muscles of the leg. To the speaker's knowledge this paralysis lasted over one year; and, in addition to said paralysis, there developed trophic ulcers upon the foot, also a marked edema. There was, at the end of a year, almost no sign of restoration of the power of those muscles; and the trophic ulcers, while they would heal, would appear in new regions. While the speaker has lost track of this case, it is his opinion that probably the trophic condition of the foot will put that patient in such jeopardy that amputation might eventually be necessary; and whether or not the restoration of function in the nerve can take place after at least a year he is unable to tell. However, it was a case which bears out the experimental results of Dr. Gordon and certainly shows vividly the danger of injecting alcohol into such a nerve. It was done for sciatica.

Dr. Edward B. Angell, Rochester, N. Y., asked Dr. Gordon whether he had examined, by chance, the sciatic nerve after the injection of a saline, rather than alcohol, averring such would be rather interesting. He understands that such is the course now taken by men who are using injections for the relief of neuralgias. Dr. Killian, of New York, in a paper before the New York State Medical Society, cautioned all who were using this method of treating neuralgia against injecting the sciatic nerve with alcohol. He himself (Dr. Killian) uses a large amount of saline and believes that the improvement is due to the mechanical effect of tearing up the perineureum or loosening the adhesions, as we do in stretching the nerve for neuralgias. That procedure, from Dr. Killian's point of view, seemed to be quite safe, but he strongly advised against the injections of alcohol in sensory nerves.

Dr. Peter Bassoe, Chicago, considered it a rather painful duty to tell about an experience with an injection in a case of sciatica, not with alcohol, but with salt solution, a method which the speaker has used a good deal, and is still using, in spite of said experience. In the summer of 1908 he injected a number of cases at the Cook County Hospital, of Chicago, and a number of cases were injected by the internes, both in the speaker's service and in that of his colleagues. In his presence there was one typical case of sciatica (so far as he could diagnose) injected by an interne; and within, say, half a minute, or at most within one minute, a complete sciatic paralysis was produced. The needle was introduced through the buttocks rather high up, using the landmarks advised by some French writers by drawing a line from the junction of the coccyx and sacrum over to the upper border of the trochanter. The patient was a nervous man and jumped, so the needle possibly transfixated the nerve; possibly that had something to do with it; but at any rate the paralysis and loss of sensation were instantaneous. Dr. Bassoe at once examined him, and found there was a complete paralysis of all the muscles below the knee, and a typical distribution of the anesthesia. The speaker did not expect that this would last long. The man's sciatica was cured, and never has returned. He saw the patient again less than two weeks ago and he still has a complete paralysis of those muscles. The anesthetic area has diminished a little. There is a marked atrophy of the muscles concerned. As he remembered the saline solution used in that case was a little stronger than a physiological salt solution, possibly as strong as 2 per cent. sodium chloride; Dr. Bassoe had never seen anything like it since. He has kept on using the method, considering that this was an altogether exceptional instance, but has thought it well to relate it in case

anybody else had had any similar experience. So far he has not heard of sciatic paralysis from injections of salt solution in any other case.

Dr. Alfred Gordon, Philadelphia, replying to Dr. Angell's question regarding his personal experience with injections of saline solutions, said that he had had quite a number of cases that he relieved with this procedure; though that was all he could say, relieved, not cured, sciatica with physiological salt solution. He had also had cases wherein he followed the method advised by a French author, who recommended the injection of sterile air into the nerve. He had tried in two cases the injection of plain distilled water and obtained the same results as with the saline solution. He had never observed such a disastrous result as the last speaker mentioned from injecting saline solution into the sciatic nerve; what occurred in his case Dr. Gordon did not know; but he called the Association's attention to the possibility of the saline solution being stronger than normal. This had had something to do, perhaps, with the destruction of the nerve, but, besides this, the time elapsed was not entirely sufficient to judge; and Dr. Gordon asked Dr. Bassoe how long it had been since the experience recited.

Dr. Peter Bassoe replied, nearly five years ago.

Dr. Alfred Gordon remarked that was long enough to determine. The experiments undertaken by him had been going on for two years; he obtained these results a long time ago, but he was very careful in collecting them and studying them for the purpose of reporting before this Association. He has found out, from his experiments, that injection of alcohol into a sensory nerve or a mixed nerve was very damaging; even at the end of nine days he had found considerable changes in the Gasserian ganglion and in the nerve depending on the Gasserian ganglion, so that in his practice he had been very careful in injecting alcohol; he actually feared for the subsequent results, and also for the remote results, with reference particularly to atrophic disturbances; and, as mentioned in the speaker's case, in one case there was an eruption over the area of distribution of the infraorbital nerve; in another case the man accidentally fell and injured the skin, and the healing process took about three months. This was also a considerable warning to anyone in using alcoholic solutions. He also uses at the present time in a number of cases (one of his latest cases is the case of a nurse in one of the hospitals of Philadelphia) injections of distilled water into the infraorbital nerve. He gets with distilled water favorable results; the water produces no ill effect; it probably separates individual fibrils and relieves pressure; and while he is unable to clearly define the difference in the processes, his final conclusion, at any rate, is that the results are identical. With regard to Dr. Strauss' experience, it was certainly a very striking and interesting one. The speaker had several cases of the same kind. In the experiments of Brissaud in 1896, permanent damage was done to the sciatic nerve in an individual who he thought would be benefited by the injection of alcohol. Besides this, we have the statement, also of the originator of the injections of alcohol, in which a permanent peroneal palsy followed an injection. His personal experiments proved to the speaker absolutely conclusively that, in accordance with what we observe clinically in man, injections of alcohol into the facial nerve for relief of facial spasm is absolutely harmless. Dr. Gordon has obtained relief from this spasm for 15 months, in one of his old cases for almost two years; he had also cases in which the spasm returned; he then injected several times, but no perma-

nent damage has been observed. They all recovered from the paralysis. The experiments on the dogs corroborate these results. On the other hand, permanent damage results from the injection into sensory or mixed nerves.

(To be continued)

NEW YORK NEUROLOGICAL SOCIETY

OCTOBER 7, 1913

The President, DR. SMITH ELY JELLIFFE, in the Chair

TUMOR OF THE SPINAL CORD

By H. Climenko, M.D.

Two cases were reported and the specimens shown. The first case, which the speaker said was an instance where syphilis could mask the diagnosis of a tumor of the cord, was that of a married woman, a Jewess, 55 years old; a native of Austria. When she was admitted to the Montefiore Home, on November 17, 1911, she stated that both of her parents had died in the forties, her mother of some wasting disease of many years' duration. One brother died of cardiac disease. There was no history of miscarriages in the family.

She was the youngest child, breast fed; had convulsions in early childhood and was always of a weak and delicate constitution. Her menstrual history was negative. She married at the age of 21; she was the mother of nine healthy children and had never miscarried. About four years after her marriage she was treated for cystitis, and ten years ago she had a superficial ulceration of the left leg.

Her present illness, dating back about fifteen months, was insidious and progressive. She first suffered from numbness and tingling and tugging sensations, commencing in the soles of both feet and gradually extending up to the hips. Shortly afterwards she developed pains in the region of the mid-spine radiating downward into both legs. These were more or less constant. Following these, there was weakness and stiffness in both legs which was preceded by a girdle sensation in the lower abdomen. About three months later she lost the power to walk, and two months prior to her admission, incontinence of both the urine and feces developed. A few weeks ago, she noticed tingling sensations in the little finger of the right hand. There was no history of diplopia, headaches, vomiting nor convulsions.

When Dr. Climenko first saw the patient, at the time of her admission to the home, she could neither stand nor walk. She lay on her back and could sit up only with difficulty. Both lower extremities were flexed and extremely spastic. The double Babinski, Oppenheim, Mendel and Bechterew reflexes were present. There was double ankle clonus and both knee jerks were very lively. The lower abdominal reflexes were absent. The various reflexes of the upper extremities were present and normal; the pupils reacted to light, accommodation, pain and consensually. The gross motor power of the active movement in the lower extremities was greatly diminished and carried out very sluggishly. The passive movements were difficult to carry out, due to the enormous spasticity. The spine did not show any deformities, but there was marked hypersensitivity

to pressure over the tenth, eleventh and twelfth dorsal spines. The cranial nerves were negative. There were marked sensory disturbances, extending from the mammae downward anteriorly and posteriorly. An examination of the blood gave positive reaction to the Wassermann test. The cerebrospinal fluid was negative, but showed an increase of globulin. The patient was given two full doses of salvarsan and many intramuscular bichloride injections, after which her condition was slightly improved.

On May 20, 1912, after a careful study of the sensory disturbances, and influenced by the marked spinal tenderness, a diagnosis was made of a lesion within the spinal canal, causing pressure on the cord. The patient was operated on by Dr. Charles A. Elsberg on June 14, 1912, when he removed an elliptical, cauliflower-like tumor, situated at the level of the ninth, tenth and eleventh dorsal vertebrae, and measuring $\frac{3}{4} \times \frac{1}{2} \times \frac{1}{4}$ inches. Pathologically, this proved to be an endothelioma.

The second case reported by Dr. Climenko was that of a widow, 52 years old, born in Russia, of Jewish parents, who entered the Montefiore Home on March 21, 1913. In her case the symptoms, which pointed to a lesion in the upper segment of the cord, were such that an operation could not be entertained. She died on July 6, 1913, and the autopsy showed a tumor in the cervical region, the cord here being enlarged throughout its entire length to about twice its normal thickness. Pathologically the lesion was a gliosarcoma, with resulting degeneration of the cord.

A CASE OF MANIC-DEPRESSIVE PSYCHOSIS IN A CHILD

By M. S. Gregory, M.D.

The author presented a girl, ten years old, who was born in Austria and came to this country with her parents about three months ago. No history of a psychosis or a neurotic taint in the family or its collateral branches was obtainable. The patient was the third of four children, two of whom died in infancy. Her childhood was apparently normal, and during that period she had the usual diseases, without complications or sequelae. She was considered an average scholar, and her deportment showed no abnormality. She was bright and cheerful, took an active interest in play and associated with children of her own age. However, she was easily angered and excited, and unduly sensitive. She was an only daughter.

The child's parents stated that she was perfectly well until the early part of August, 1913, when she experienced a great disappointment because her mother would not permit her to go to a party. On the following day she was unusually quiet and sad, complained of headache and refused food. She insisted that she was weak and had a pain in the cardiac region. She would remain seated in one place without showing much interest.

On August 24, 1913, when she was brought to Bellevue Hospital, a physical examination revealed no objective evidence of a neurological disorder. The pupils responded to light and accommodation; the optic disks were normal. The knee jerks were active and there were no sensory disturbances nor hysterical stigmata. Mentally, she was profoundly depressed and remained in the characteristic attitude of flexion, with head bowed and body bent forward. Her general movements were slow and delayed. She said nothing spontaneously; answered a few questions to

the point, but in a rather low tone of voice and after some deliberation. She complied with the usual requests, although slowly. When asked what ailed her she complained of headache and pain in the stomach; said that she could not walk and wished to go home. She would calculate slowly, and occasionally, when she made mistakes and her attention was called to them, she would rectify them. She was well oriented and gave a good account of herself, memory for both remote and recent events being good. There were no hallucinations nor delusions. In the ward she would sit quietly by herself, manifesting no initiative. She took food when it was given to her, but never asked for anything nor expressed any desire. However, she seemed to be in touch with her surroundings and apparently took notice of what was going on about her.

She remained in this condition for several days, but gradually improved, so that on September 13, about three weeks after admission, she was taken home contrary to medical advice.

Her mother stated that when she returned home she was in fairly good condition for a few days, but that her depression soon returned. She was readmitted to the hospital a week later in a condition much the same as that on her first admission. However, she soon began to improve and at the last report she was fairly active, smiled occasionally, spent her time in playing with picture blocks and puzzles, and took outdoor exercise, but she was still quiet and was rather slow in her movements. She did not talk spontaneously, but when addressed she smiled and answered questions in a low tone of voice. She said she now felt well and was anxious to go home. The Binet-Simons test showed her scale of intelligence equal to nine and a half years of age.

Manic-depressive psychosis, Dr. Gregory said, was apparently very infrequent in childhood. At least, the literature was very meager. It was possible that the disease was more frequent than suspected and that such cases were often unrecognized and mistaken for other disorders. Very often the depression might be associated by the parents and even by the family physician with the bodily condition of the child, and these cases naturally rarely came to the attention of the psychiatrist. During the past eleven years, the speaker said, he had seen only four cases under the age of twelve years. Manic-depressive attacks, however, occurring between the ages of twelve and fifteen were comparatively frequent. The youngest of his four cases was in a girl of seven, who had the manic phase of the disease, which lasted six weeks and ended in recovery. In another, a boy of eleven, the disease followed a severe fall. He had alternate attacks of depression and excitement, each lasting a week. He recovered in five weeks. The third, a boy of twelve, manifested an attack of excitement of two weeks' duration, with complete recovery.

It was of interest to note that in all of the cases mentioned, the attacks were of rather short duration, which coincided with the observations of Ziehen and others.

The president, Dr. Jelliffe, said that so far as his review of the records showed, this was the first case of manic-depressive psychosis in a child of ten years that had ever been presented or reported at a meeting of this society. He agreed with Dr. Gregory that such cases might readily be overlooked by the parents or physician, and that the symptoms might be attributed to malaria or constipation or various other bodily ailments.

Dr. William B. Noyes said it was rather difficult to definitely classify a case of this kind without a better understanding of the various grada-

tions of mental depression or excitement associated with the mental changes that were not uncommonly observed about the age of puberty. The exaggeration of the normal changes frequently observed in the child at that period of life resembled certain psychoses of later life. In some children these changes were entirely physiological; in others they were slightly exaggerated, or again we might have the extreme type, as evidenced in this case, although the symptoms might not be so sharply defined. This, perhaps, might be accounted for by the fact that here we had a child of foreign parents, transplanted to a new environment, with poor surroundings and possibly influenced by the strain of over-study.

Although the case presented by Dr. Gregory appeared to present clear-cut symptoms of a manic-depressive psychosis, in the opinion of many who frequently see pathological nervous and mental conditions during childhood, it was better explained as one of a series of mental variations, not so easily classified as Dr. Gregory stated.

Dr. L. Pierce Clark said that an accurate knowledge of the family history in a case of this character might prove a very important factor in making more definite the diagnosis here. Undoubtedly the case was rare in literature only. He had seen two similar cases, though less severe and definite. The case furnished a sad commentary upon our insufficient studies of the psychopathies of childhood. What we really ought to have was an intensive analysis of the development of physical and mental habits, the personality and character of childhood both in normal adjustments and abnormal adaptations to psychic shocks and crises. Often enough in the past all concerned had been quite content to put even as severe a mental depression as shown in Dr. Gregory's case into a class of physical ailments of childhood; but here a fairly well defined psychotic disorder was too evident to be disproved in such manner. He saw no good reason, however, why we should strive so hard to fit adult psychoses upon such young shoulders. Would it not be better to develop our types of psychoses of childhood upon the basis of symptom complexes as they presented themselves, and gradually make disease entities as they came into a well-rounded clinical type largely independent of the nosological designations of adult psychoses? This had been one of the greatest contentions of Meyer, he believed, in his studies upon the nature of dementia præcox, and appeared to be the excellent purpose of Hoch's studies in the development of the shut-in and open personalities of the same group. No doubt psychopathic clinics in connection with the public schools, now being established in this country and abroad, would soon furnish us with a definite material and a better knowledge of just such cases as Dr. Gregory here presents.

Dr. A. A. Brill said he could recall two cases of this type, one a girl of about seven years whom he saw at the Vanderbilt Clinic and later referred to Dr. Gregory, and the other a boy about ten, whom he saw in Dr. Gregory's out-patient department. This boy was in a very excited and maniacal state; he constantly talked about blood, which his mother attributed to the fact that he had seen some chickens slaughtered. The whole picture presented, besides the maniacal state, a certain phase of obsession of the compulsion neurosis type. The little girl, although evincing an unmistakable maniacal phase, also presented some hysterical features, and suffered besides from a rather severe gonorrheal infection.

Dr. Brill asked whether there was any question of hysteria in these cases.

Dr. B. Onuf said that in cases of this kind the question of heredity was a very interesting one to investigate. His own observations had led him to believe that in psychoses of this character, particularly in the circular cases, we not infrequently found a direct history of manic-depressive heredity.

INTRASPINOUS TREATMENT (SWIFT-ELLIS) FOR GENERAL PARESIS

Dr. Jelliffe, in introducing a general discussion on this subject, said the year 1913 promised to be a memorable one in the history of general paresis. It was early in the year that Moore and Noguchi announced the finding of *Treponema pallidum* in the brains of paretics. It was demonstrated before this society at the March meeting. It was before this society, at the April meeting, that Drs. Swift and Ellis presented the details of their treatment by the intraspinous method; it was in the early part of this year that Drs. Nichol and Hough of Washington announced the successful cultivation of the *Treponema* from the cerebrospinal fluid of cerebrospinal syphilis, which cultivation experiments were also successfully carried out by Noguchi and others. The findings of Moore and Noguchi were verified in various quarters. The organism had been found dead and alive, and in the dead and living tissue; the latter first by Forster of Berlin, who obtained them from brain punctures of the living patient.

Successful inoculation experiments on rabbits have been made with living brain tissue of paretics, and the results of these successful experiments have been passed on to other rabbits and the organism isolated; and the chain of evidence has practically been made complete.

All this has been done within the twelve months preceding this date, and as a result the problem of the treatment of general paresis resolves itself down to the treatment of syphilis in a particular organ of the body and how best can this be accomplished.

Dr. Jelliffe said that his purpose in bringing this subject to the attention of the society again, after the lapse of so short a time as six months, has been determined by a number of reasons. In the first place, it has always seemed to him that perhaps the most important function of a society of this kind, consisting for the most part of active specialistic workers, should be to be on the firing line, as it were, of advance in that branch which the society represents; that subjects brought up for discussion, which have reached a fairly final state of solution, were already the property of most of the members of such a society; that when the final word has been said everybody knows it and therefore the material presented ceases to have that quickening and stimulating value which could come from considerations of questions which are as yet in the state of being born.

Therefore, the discussion which we have planned for the evening, and thanks for which he gave to those about to participate in it, was presented as a more or less nascent problem. If it were somewhat nebulous, if it contained more hopes and aspirations than definite records of positive acquisition, the position already outlined would be sufficient reason for bringing the matter up again.

He had thought, more or less, to narrow the discussion to the treatment of paresis, because it seemed to him that here was an avenue in which a great work might possibly be accomplished, and that if attention were

baldly and boldly directed towards a problem which in the past has been unconquerable even an expression of our hope might be of value to the parietic. Certainly the valuable hints that were received at a former session of this society, in which the outlines of the Swift-Ellis method of treatment of syphilis of the nervous system were given, should not be laid aside while there is any possibility that a turning over of the same might result in profit. Even if it be granted that the time is as yet short, that the material as yet is but inconclusive, yet certainly in the experience of some of those about to discuss the paper of the evening, and in that of others who he hoped would discuss it, certain questions might arise which might be worthy of discussion.

In the first place, what are some of the accidents which have accompanied the spinal puncture, and the free utilization of the spinal canal? Have they been sufficiently serious to constitute a bar to its further use? Have they been sufficiently painful and disappointing to the patient to prevent their use? In other words, have we gained enough information concerning possibilities to enable us to outline a position?

On the other hand, to what source must the advantages be attributed? What is the psychic factor of a new hope, of a new method of treatment? What reliance can be placed upon the unquestionable biological improvement? How does it coincide with the clinical manifestations? How long must one wait before a clinical observation must lag behind biological suggestions, and how far do the biological data enable one to extend one's hopes of positive results? Is the optimistic attitude a justifiable one, further than the general philosophical value of all optimistic attitudes in contradistinction to all pessimistic ones?

These are the questions which he felt certain are of interest to others as well as himself and which he trusted would enter into the remarks of those about to speak.

Dr. William H. Hough, clinical pathologist to the Government Hospital for the Insane at Washington, D. C., said it had now been definitely established, chiefly through serological investigation and through the finding of the *Treponema pallidum* in the disease process by Noguchi and Moore, Levaditi, Foster and others, that syphilis was an essential factor in the production of paresis, and although it was quite apparent that it was not the only factor entering into the etiology of the disease, yet our object of treatment, as in all infections, was to relieve the patient of the infectious organism. Therefore, any light that might be thrown upon the nature of the action of the infective virus might be of assistance in the treatment of the disease. This seemed especially important in the consideration of such a protean disease as syphilis.

Concerning the treatment of paresis, the speaker said he would consider only the intraspinal injection of salvarsanized serum, as recommended by Drs. Swift and Ellis. We should bear in mind that we were dealing with a general constitutional disease which involved the nervous system especially, and not a disease confined to the brain alone. We were dealing with a disease process which involved a vital and an inaccessible part of the body, the infective agent being the *Treponema pallidum*, probably in an especially virulent form. From his own experience with this method of treatment, which included three cases of paresis and one of cerebral lues, he could make no statements as to the final results, and his object in making this report was to show that they had already obtained results which could only be interpreted as evidence of the

efficiency of the treatment for the inflammatory syphilitic process, but whether we could arrest the entire paretic process permanently was still undetermined, although from the clinical improvement obtained in some cases and from a theoretical standpoint the outlook certainly seemed promising. The uniformity of the results obtained thus far indicated to him that it was the most efficient treatment for paresis that had thus far been recommended. The all important point was to institute treatment early in the disease, and this we were now enabled to do with our improved method of diagnosis. This was perhaps more important in paresis than in tabes, inasmuch as a more vital and inaccessible part of the nervous system was affected. For this reason we naturally expected, and, judging from reports, were obtaining more favorable results in the latter disease than in the former. For syphilis of the central nervous system occurring in the early stage of the disease the speaker said he believed the intraspinal injections were to be recommended, although good results could be obtained in this condition by the proper use of mercury and salvarsan intravenously.

Dr. Hough said the technique he had employed was the same as that originally recommended by Swift and Ellis, excepting that after the first few injections he used 40 c.c. of a 50 per cent. serum instead of 30 c.c. of a 40 per cent. serum. As to after-effects, he had observed none of any consequence, although there was sometimes a slight elevation of temperature, and in one case there was on several occasions a marked reduction of the pulse rate. The urine had remained normal in all cases. Thus far he had given thirty-one treatments.

Dr. Hough then briefly reported three cases of paresis and one of cerebral syphilis in which he had employed this method of treatment. All of these patients were still under observation, and while he could make no statement as to the final results, he was convinced that it marked a distinct advance in the treatment of this hitherto almost invariably fatal disease. Judging from the effect that salvarsan had upon other similar spirochæte diseases, especially yaws and other protozoan affections, and from the rapid advancement in chemotherapeutics as particularly indicated in the recent article by Ehrlich, he anticipated that in the near future the chemotherapy of syphilis would be so perfected as to prevent the development of the late nervous manifestations, which now showed such resistance to treatment.

Dr. H. S. Ogilvie, speaking for Dr. John A. Fordyce, who was detained at home by illness, reported the case of a man who was taken to the Riverdale Hospital on June 12, 1913. He was extremely loquacious and made numerous unreasonable demands and suggestions. The following night he became very noisy and fought his attendants violently. He was disoriented, and his delusions, both visual and auditory, were very pronounced. He was fearful lest his attendants would kill him, and insisted that his brother and other members of his family were plotting against him. He boasted of his vast wealth and power. On June 19 he was transferred to Sandford Hall at Flushing, L. I., where his condition remained unchanged for the following three weeks. At times he was quiet and would take a small quantity of food, but for the most part he was extremely noisy and at times violent, and it was necessary to keep him almost constantly under the influence of hyoscine and morphia.

On July 16, 1913, the patient was given an intraspinal injection of 30 c.c. of a 40 per cent. solution of salvarsanized serum, after the method

of Swift and Ellis, the serum being prepared from blood taken from another patient one hour after a full dose of salvarsan. No change in his condition was noted during the following ten days. During this period it was found necessary to catheterize him daily. He was practically confined to bed, as otherwise it was extremely difficult to control him. His delusions and grandiose ideas still persisted. His memory had apparently slightly improved and orientation was better. On July 26 and again on August 4 the intraspinal injection was repeated. Following these treatments he was quieter, took his food well and slept better. His grandiose ideas were less marked and he seemed to have a better insight into his condition. His delusions of persecution, however, persisted, although not as marked as before. On August 14, about thirty minutes after an intraspinal injection, he had a mild convulsion. The nurse reported that his whole body suddenly became rigid and trembled for a few seconds, when he seemed to awaken with a start and looked about the room as though dazed. During the following week he steadily improved and sometimes it was almost impossible to detect any evidence of his psychosis.

On August 22 he was given another intraspinal injection, which produced no reaction. The patient now seemed so much better that he was permitted to see his wife. He behaved well for the first fifteen or twenty minutes, but when the question of his leaving the sanatorium came up and he was told that he had better remain a few weeks longer he became very much excited and said that his family had no right to deprive him of his liberty. He agreed to return to the hospital, however, where he was now allowed to take long walks in the country and receive daily visits from his wife. He behaved well and showed but little evidence of his trouble. This was chiefly a tendency to be aggressive and sometimes unreasonable towards his attendants and physicians.

On August 29 he received another intraspinal injection. As there had not been much change in his condition during the two previous weeks, it was decided to treat him with serum from his own blood. On September 4 he was given 0.45 gm. of salvarsan intravenously, and fifty minutes later about 50 c.c. of blood was taken from the opposite arm. From this a 40 per cent. serum was prepared, and on the following day he was treated intraspinaly. He had no reaction from the salvarsan nor from the intraspinal treatment, and following this there was a very definite improvement in every way. The patient was brighter, he had a splendid insight into his condition, his grandiose ideas had practically entirely disappeared and he spoke kindly of his brother and his wife. He was so well that he was permitted to go home for two days, and upon his return to the hospital he seemed to be normal in every way. His last treatment was on September 11, when he was again given salvarsan, followed by an intraspinal injection with a solution of his own serum.

Dr. H. A. Cotton, of Trenton, N. J., presented a young man of eighteen, who first came under his observation about April 29, 1912, with the history of convulsions, the first attack in December, 1911, the second the following April, and after that occurring with greater frequency. He was then attending school, but had to give up his studies on account of increasing irritability and dullness. The patient had a specific history, and a lumbar puncture, made in April, 1912, gave a positive reaction. He received several doses of salvarsan, and in April, 1913, after a consultation with Dr. Swift at the Rockefeller Institute, the intraspinal treatment with salvarsanized serum was commenced. The injections were repeated every two

weeks up to June 2, and the patient, who was now living on a farm, was still under Dr. Cotton's observation. The cytological findings were now practically negative, the patient had gained thirty pounds in weight and showed no mental abnormalities at the present time. He still had stiff pupils and an occasional convulsion, but he was able to travel about by himself, and the improvement in his general condition had been very marked under this new method of treatment.

In connection with this case, Dr. Cotton briefly reviewed the findings in eight additional cases of general paresis in which the intraspinal method of treatment had been employed by him. In two of these cases which came to autopsy, salvarsan was found in the ventricular fluid, which seemed to effectually answer the query whether the remedy was carried to the brain after intraspinal injection, or was limited to the cord.

Dr. Cotton said that while these reports were only preliminary, the results obtained thus far had convinced him that this method would prove efficient, providing it was undertaken in the early stages of the disease. In his early cases, the clinical symptoms had undoubtedly improved, together with the biological findings. This did not hold good in the late cases. He had, however, seen no bad effects follow the treatment in the late cases; he knew of no contraindications to the method, and expected to continue to employ it, especially in the early cases. He regarded it as a step in the right direction, and said that in the intraspinal method of treatment we had something that promised well in general paresis. We all understood, of course, that there was no possibility of curing these patients in the end stage. Just how far a case of paresis could go before the treatment had lost its effect on the process we could not say. We should not expect to regenerate a paretic brain, but the results thus far obtained led to the hope that we might be able to arrest the process during the early stages of the disease. The extent of recovery would depend on the amount of destruction of the brain that had already taken place. At the Trenton State Hospital the treatment had been resorted to in nine cases, including the juvenile case shown at the meeting. In all of these, the pupils had remained stiff. The knee jerks had returned in one case. All the early cases had shown marked improvement, but in that connection we should take into consideration the normal proportion of remissions that were frequently seen in general paresis, as well as our own optimism in taking up a new method of treatment.

Dr. Burt Asper, of the Sheppard and Enoch Pratt Hospital, at Towson, Md., said there was practically nothing to add to this excellent presentation of the subject. At the institution with which he was connected they had injected ten cases of general paresis and one case of tabes by the intraspinal method, and their results closely paralleled those reported by Drs. Hough and Cotton. At the Sheppard Hospital they were fortunate in having had two early cases. One was a stone-cutter, 39 years old, who gave a history of specific infection dating back twenty-one years, and who developed mental symptoms some two months before coming to the hospital. The case was unquestionably one of general paresis of the grandiose type, and the symptoms were typical. Following the first intraspinal injection the symptoms were aggravated, but after the second injection they moderated somewhat, and after the third one his mental condition cleared up entirely, although his physical signs remained unchanged. His memory defect had disappeared and he was permitted to return to his occupation, at which he was still engaged. Thus far he had shown no evidence of a relapse. He was still under observation and treatment.

The second early case was that of a cigar maker, 45 years old, whose mental symptoms dated back six months. They were of the maniacal type and cleared up entirely under the intraspinal method of treatment. This patient was still under observation.

Dr. Asper expressed the opinion that in the intraspinal injection of salvarsanized serum we had a very valuable method of treating general paresis—something which we had never had before.

Dr. Homer F. Swift, of the Rockefeller Institute, said that their experience with the treatment of general paresis by the intraspinal method was comparatively limited and he would restrict himself to a few points in regard to the method. He was interested in the statement made by Dr. Cotton that after an intraspinal injection the fluid taken from the ventricle of the patient was found to contain arsenic. This finding was in line with some work done in Dr. John Howland's clinic in Baltimore where phthalein was introduced by lumbar puncture into the subarachnoid space and two hours later fluid obtained from the ventricles was shown to contain phthalein—50 per cent. of phthalein as compared with 100 per cent. in fluid obtained at the same time from lumbar puncture. In cases where the phthalein was introduced intravenously, however, there was no excretion into the fluid of either the ventricles or subarachnoid space. It is fair to assume, therefore, that arsenic or other drugs introduced into the spinal canal by means of lumbar puncture, reach all points of the cerebrospinal system (at least the larger cavities) which are bathed by the cerebrospinal fluid. Uhlmann has shown that after intravenous injection arsenic is not present in the nervous tissue in the same proportion as in other parenchymatous organs.

Dr. Swift said that the experience with the direct introduction of neosalvarsan into the spinal canal, had shown that severe, unpleasant symptoms followed the use of the drug in this way. Both from a practical and experimental standpoint, the direct introduction of salvarsan into the cerebrospinal fluid is inadvisable. Contrary to the experience of some of those that preceded him, no catheterization has been necessary after the introduction of salvarsanized serum into the spinal canal except where the patient has previously suffered from retention. In most of the cases the bladder symptoms have improved following intraspinal injections.

Dr. Swift said that he wished to call attention to the value of the titration method in doing the Wassermann test of the cerebrospinal fluid and the importance of using a large quantity of the fluid. In doing the test they employ up to five volumes as compared with blood serum and by using these larger quantities the negative reactions become less numerous. The speaker also mentioned the value of making control tests, continuing either intraspinal or intravenous treatment until a negative reaction is obtained. In their own cases the improvement in the reaction usually goes hand in hand with clinical improvement. In some of the cases the fluid has remained negative for a year and a half after cessation of treatment, and there has been no advance in the tabetic symptoms. They have found that the pleocytosis is the first to disappear, the Wassermann is more likely to disappear next, and, finally, the globulin excess. In the four patients with paresis or tabo-paresis the clinical improvement has not been very marked. One of the patients, however, is showing very distinct improvement.

Patients with initial, intensely strong Wassermann reaction in the cerebrospinal fluid, usually require much more treatment than those with

a weaker reaction. Of twenty-seven cases of tabes under treatment with the combined method, 50 per cent. show entirely negative Wassermann in the fluid; 30 per cent. more require the largest quantity of fluid to show a reaction. If tabes and general paralysis are similar diseases involving different portions of the central nervous system, then the results obtained in tabes certainly offer an encouraging outlook in paresis.

Dr. H. LeBaron Peters, of Bridgeport, Ct., said he had at the present time six cases under treatment by the intraspinal injection method, of whom none had received more than four treatments. Two of these were cases of general paresis, two of tabes and two of cerebrospinal syphilis. The two paretics had shown considerable improvement from the biological point of view, and in one of them, particularly, there was a marked clearing of the mental condition. Of the others it was too early to speak definitely.

No untoward symptoms following the treatments were noted except in the case of one of the tabetics. Here, however, there was for several hours after the treatment a marked exacerbation of "lightning pains."

Dr. William M. Leszynsky said that it is not at all surprising that salvarsan should be found in the fluid in the lateral ventricles after injections into the spinal canal.

During the epidemic of cerebrospinal meningitis several years ago, it was noted by the late Dr. H. P. Loomis that after argyrol was introduced into the spinal subarachnoid space, it was found at the autopsy distributed over the cerebral cortex.

Translations

MYTH OF THE BIRTH OF THE HERO

BY OTTO RANK, M.D.,

OF VIENNA

TRANSLATED BY DRS. F. ROBBINS AND SMITH ELY JELLIFFE

(Continued from p. 807)

It has thus been our good fortune to show the full accuracy of our interpretative technique upon the material itself, and it is now time to demonstrate the tenability of the general viewpoint upon which this entire technique is founded. Hitherto, the results of our interpretation have created the appearance of the entire myth formation, starting from the hero himself, namely from the youthful hero. At the start we took this attitude in analogizing the hero of the myth with the ego of the child. Now we find ourselves confronted with the obligation to harmonize these assumptions and conclusions with the other conceptions of myth formation, which they seem to directly contradict.

The myths are certainly not constructed by the hero, least of all by the child hero, but they have long been known to be the product of a people of adults. The impetus is evidently supplied by the popular amazement at the apparition of the hero, whose extraordinary life history the people can only imagine as ushered in by a wonderful infancy. This extraordinary childhood of the hero, however, is constructed by the individual myth-makers—to whom the indefinite idea of the folk-mind must be ultimately traced—from the consciousness of their own infancy. In investing the hero with their own infantile history, they identify themselves with him, as it were, claiming to have been similar heroes in their own personality. The true hero of the romance is, therefore, the ego, which finds itself in the hero, by reverting to the time when the ego was itself a hero, *i. e.*, the revolt against the father. The ego can only find its own heroism

in the days of infancy, and it is therefore obliged to invest the hero with its own revolt, crediting him with the features which made the ego a hero. This object is achieved with infantile motives and materials, in reverting to the infantile romance and transferring it to the hero. Myths are, therefore, created by adults, by means of retrograde childhood fantasies,⁸² the hero being credited with the myth-maker's personal infantile history. Meanwhile the tendency of this entire process is the excuse of the individual units of the people for their own infantile revolt against the father.

Besides the excuse of the hero for his rebellious revolt, the myth therefore contains also the excuse of the individual for his revolt against the father. This revolt had burdened him since his childhood, as he had failed to become a hero. He is now enabled to excuse himself by emphasizing that the father has given him grounds for his hostility. The affectionate feeling for the father is also manifested in the same fiction, as has been shown above. These myths have therefore sprung from two opposite motives, both of which are subordinate to the motive of vindication of the individual through the hero: on the one hand the motive of affection and gratitude towards the parents; and on the other hand, the motive of the revolt against the father. It is not stated outright in these myths, however, that the conflict with the father arises from the sexual rivalry for the mother, but is apparently suggested that this conflict dates back primarily to the concealment of the sexual processes (at child-birth), which in this way became an enigma for the child. This enigma finds its temporary and symbolical solution in the infantile sexual theory of the basket and the water.⁸³

The profound participation of the incest motive in myth formation is discussed in the author's special investigation of the Lohengrin saga, which belongs to the myth of the birth of the hero. The cyclic character of the Lohengrin saga is referred

⁸² This idea which is derived from the knowledge of the neurotic fantasy and symptom construction, was applied by Professor Freud to the interpretation of the romantic and mythical work of poetic imagination, in a lecture entitled: "Der Dichter und das Phantasieren" (Poets and Imaginings) (Reprint, 2d series of Collected Short Articles), p. 1970.

⁸³ For ethno-psychologic parallels and other infantile sexual theories which throw some light upon the supplementary myth of the hero's procreation compare the author's treatise in *Zentralblatt für Psychoanalyse*, II, 1911, pp. 392-425.

by him to the *fantasy of being one's own son*, as revealed by Freud (p. 131; compare also pp. 96 and 990). This accounts for the identity of father and son, in certain myths, the repetition of their careers; the fact that the hero is sometimes not exposed until he has reached maturity, also the intimate connection between birth and death, in the exposure-motive. (Concerning the water as the water of death, compare especially chapter V of the Lohengrin saga.) Jung, who regards the typical fate of the hero as the portrayal of the human libido and its typical vicissitudes, has made this theme the pivot of his interpretation, as the fantasy of being born again, to which the incest motive is subordinated. Not only the birth of the hero, which takes place under peculiar symbolic circumstances, but also the motive of the two mothers of the hero, are explained by Jung through the birth of the hero taking place under the mysterious ceremonials of a re-birth from the mother consort (*l. c.*, p. 356).

Having thus outlined the contents of the birth myth of the hero it still remains for us to point out certain complications within the birth myth itself, which have been explained on the basis of its paramoid character, as "splits" of the personality of the royal father and persecutor. In some myths, however, and especially in the fairy tales which belong to this group,⁸⁴ the multiplication of mythical personages, and with them, of course, the multiplication of motives, or even of entire stories, are carried so far that sometimes the original features are altogether overgrown by these addenda. The multiplication is so variegated and so exuberantly developed, that the mechanism of the analysis no longer does it justice. Moreover, the new personalities here do not show the same independence, as it were, as the newly created split personalities, but they rather present the characteristics of a copy, a duplicate, or a "double," which is the proper

⁸⁴ The fairy tales, which have been left out of consideration in the context, precisely on account of these complications, include especially: "The Devil with the Three Golden Hairs" (Grimm, No. 29), and the very similar "Saga of Emperor Henry III" (Grimm, *Deutsche Sagen*, II, p. 177), "Water-Peter," with numerous variations (Grimm, III, p. 103), "Fundevoegel," No. 51, "The Three Birdies" (No. 96), "The King of the Golden Mountain" (No. 92), with its parallels, as well as some foreign fairy tales, which are quoted by Bauer, at the end of his article. Compare also, in Hahn, "Greek and Albanese Fairy Tales" (Leipzig, 1864), the review of the exposure stories and myths, especially 20 and 69.

mythical term. An apparently very complicated example, namely, Herodotus' version of the Kyros saga, illustrates that these doubles are not inserted purely for ornamentation, or to give a semblance of historical veracity, but that they are insolubly connected with the myth-formation and its tendency. Also, in the Kyros-myth, as in the other myths, the royal grandfather, Astyages, and his daughter, with her husband, are confronted by the cattle-herder and his wife. A checkered gathering of other personalities which move around them, are readily grouped at sight: Between the high born parent couple and this child stand the administrator Harpagos with his wife and his son, and the noble Artembares with his legitimate offspring. Our trained sense for the peculiarities of myth-structure recognizes at once the doubles of the parents in the intermediate parent-couples and all the participants are seen to be identical personalities of the parents and their child; this interpretation being suggested by certain features of the myth itself. Harpagos receives the child from the king, to expose it; he therefore acts precisely like the royal father and remains true to his fictitious paternal part in his reluctance to kill the child himself—because it is related to him—but he delivers it instead to the herder Mithradates, who is thus again identified with Harpagos. The noble Artembares, whose son Kyros causes to be whipped, is also identified with Harpagos; for when Artembares with his whipped boy stands before the king, to demand retribution, Harpagos at once is likewise seen standing before the king, to defend himself, and he also is obliged to present his son to the king. Thus Artembares himself plays an episodal part as the hero's father, and this is fully confirmed by the Ktesian version, which tells us that the nobleman who adopted the herder's son, Kyros, as his own son, was named Artembares.

Even more distinct than the identity of the different fathers is that of their children, which of course serves to confirm the identity of the fathers. In the first place, and this would seem to be conclusive, the *children are all of the same age*. Not only the son of the princess, and the child of the herder, who are born at the same time; but Herodotus specially emphasizes that Kyros played the game at kings, in which he caused the son of Artembares to be whipped, with boys of the same age. He also points

out, perhaps intentionally, that the *son of Harpagos*, destined to become the playmate of Kyros, whom the king had recognized, was likewise apparently of the same age as Kyros. Furthermore, the remains of this boy are placed before his father, Harpagos, in a basket, it was also a basket in which the newborn Kyros was to have been exposed, and this actually happened to his substitute, the herder's son, whose identity with Kyros is obvious and tangible in the report of Lustin, p. 34. In this report, Kyros is actually exchanged with the *living* child of the herders; but this paradoxical parental feeling is reconciled by the consciousness that in reality nothing at all has been altered by this exchange. It appears more intelligible, of course, that the herder's wife should wish to raise the living child of the king, instead of her own *stillborn* boy, as in the Herodotus version; but here the identity of the boys is again evident, for just as the herder's son suffered death instead of Kyros in the past, twelve years later the son of Harpagos (also in the basket) is killed directly for Kyros, whom Harpagos had allowed to live.⁸⁵

The impression is thereby conveyed that all the multiplications of Kyros, after having been created for a certain purpose, are again removed, as disturbing elements, once this purpose has been fulfilled. This purpose is undoubtedly the exalting tendency which is inherent to the family romance. The hero in the various duplications of himself and his parents, ascends the social scale from the herder Mithradates, by way of the noble Artembares, who is high in the king's favor, and of the first administrator, Harpagos, who is personally related to the king—until he has himself become a prince; so his career is exposed in the Ktesian version, where Kyros advances from the herder's son to the king's administrator.⁸⁶ In this way, he constantly removes,

⁸⁵ A connection is here supplied with the motive of the twins, in which we seem to recognize the two boys born at the same time, one of which dies for the sake of the other, but directly after birth, or later, and whose parents appear divided in our myths into two or more parent couples. Concerning the probable significance of this shadowy twin-brother as the after-birth, compare the author's discussion in his *Incest Book* (p. 457, etc.).

⁸⁶ The early history of Sigurd, as it is related in the *Völsunga Saga* (compare Rassmann, I, 99), closely resembles the Ktesian version of the Kyros saga, giving us the tradition of another hero's wonderful career, together with its rational rearrangement. For particulars, see Bauer, p. 554, also the biblical history of Joseph (1 Moses, 37, et seq.), with the exposure, the animal sacrifice, the dreams, the sketchy brethren, and the fabulous career of this hero, seem to belong to this type of myth.

as it were, the last traces of his ascent, the lower Kyros being discarded after abolishing the different stages of his career.⁸⁷

⁸⁷ In order to avoid misunderstandings, it appears necessary to emphasize at this point the historical nucleus of certain hero-myths. Kyros, as is shown by the inscriptions which have been discovered (compare Duncker, p. 289, Bauer, p. 498), was descended from an old hereditary royal house. It could not be the object of the myth to elevate the descent of Kyros, nor must the above interpretation be regarded as an attempt to establish a lowly descent of Kyros. Similar conditions prevail in the case of Sargon, whose royal father is known (compare Jeremias, p. 410, annotation). Nevertheless, an historian writes about Sargon as follows (Ungnad, "Die Aufänge der Staatenbildung in Babylonien" (Beginnings of State Formation in Babylonia), *Deutsche Rundschau*, July, 1905): "He was evidently not of noble descent, or no such saga could have been woven about his birth and his youth." It would be a gross error to consider our interpretation as an argument in this sense. Again, the apparent contradiction which might be held up against our explanation, under another mode of interpretation, becomes the proof of its correctness, through the reflection that it is not the hero, but the average man who makes the myth, and wishes to vindicate himself in the same. The people imagine the hero in this manner, investing him with their own infantile fantasies, irrespective of their actual compatibility or incompatibility with historical facts. This also serves to explain the transference of the typical motives, be it to several generations of the same hero family, or be it to historical personalities in general (concerning Cæsar, Augustus and others, compare Usener, *Rhein. Mus.* LV, p. 271).

(To be continued)

Periscope

Review of Neurology and Psychiatry

(Vol. X, No. 10)

1. A Case of Disseminated Sclerosis, with Hydromyelia, Interstitial Peripheral Neuritis, and Pathological Changes in the Posterior Root Ganglia. MADGE E. ROBERTSON.

2. An Explanation of the Eruption in Herpes Zoster. A. NINIAN BRUCE.

1. *A Case of Disseminated Sclerosis.*—The patient was a maid servant and was treated at the Glasgow Royal Infirmary, of which Miss Robertson is the assistant pathologist. We append her summary:

1. The disease originated apparently in relationship to an attack of typhoid fever.

2. Some of the characteristic features of disseminated sclerosis, such as nystagmus, intention tremor, etc., were not present, owing no doubt to the fact that the sclerotic patches were confined almost entirely to the cord.

3. There was hydromyelia in the lower cervical and upper dorsal part of the cord.

4. There was a well-marked interstitial neuritis in those of the nerves examined, and changes suggesting a chronic inflammatory condition in the posterior root ganglia.

5. There were no degenerative changes in the walls of vessels, and such cells as were present round the vessels seemed to be the result of tissue reaction rather than exudate.

2. *Eruption in Herpes Zoster.*—Dr. Bruce finds his explanation in deductions drawn chiefly from his experiments on sensory nerves recorded in the *Archiv. f. exper. Path. u. Pharmak.*, 1910, Bd. 63, S. 424. These experiments were performed with a view of determining how the mechanism by which the dilatation of the vessels, which occurs in the initial stages of the reactions of the tissues to an irritant, is produced. It was found that if the terminations of the sensory fibers, *e. g.*, of the eye, were paralyzed with a local anesthetic, the reflex path, consisting of an afferent sensory fiber and an efferent vasodilator fiber, was interrupted, and the dilatation of the vessels does not take place. It was also shown that this reflex was neither cerebral nor spinal. It was demonstrated, however, that the ordinary afferent posterior root fibers when stimulated at their ends in the central nervous system produce vascular dilatation at their peripheral ends in the tissues. This is the process for which Bayliss suggested the term "anti-dromic"; and Bayliss has pointed out that there is no evidence that the limbs receive vasodilator fibers from any other source than the posterior roots. The fibers which conduct these impulses do not pass into the sympathetic chain. They do not degenerate when cut between the spinal cord and the posterior root ganglion, but they do degenerate if the posterior root ganglia be extirpated.

Bruce's experiments throw considerable light upon the experiments of Bayliss, since we learn now that these sensory fibers must bifurcate at their extremities at the periphery of the body, one limb of this bifurca-

tion passing to end in the sensory end-organs, etc., in the skin; and the other limb passing to end in the vessels. The former carries sensory impulses centralwards, the latter vasodilator impulses peripheralwards; and the common stem carries impulses, therefore, in both an ascending and descending direction.

The dilatation of the vessels which is found in the initial stages of inflammation is the result of a nervous reflex which passes up one branch of this bifurcation and down the other. It is thus an axon reflex, similar to those described by Langley (*Journ. Physiol.*, 1900, XXV, p. 364) in the sympathetic system. Such a reflex will not be influenced by section of a sensory nerve peripherally to its ganglion of origin unless the peripheral portion of the fiber be degenerated; if it be degenerated the reflex path is interrupted and the dilatation of the vessels does not take place. Similarly, a local anesthetic, by paralyzing the terminations of the sensory fibers, prevents this vascular dilatation since it prevents the stimulus from passing up the sensory fiber (*v. Quart. Journ. Exper. Physiol.*, Vol. VI, No. 1).

The purpose in Bruce's paper is to draw attention to the fact that the well-known clinical symptoms of herpes zoster may be explained by the above observations.

Herpes zoster is to be regarded as an acute specific disease of the central nervous system. The eruption most commonly makes its appearance on the third or fourth day, and it is often possible to map out the area subsequently occupied by the eruption by means of the hyperalgesia that is present. This hyperalgesia is followed by erythema and on this erythematous surface, vesicles appear. Head and Campbell compare herpes zoster to acute anterior poliomyelitis, and the late Alexander Bruce was inclined to regard the condition as a posterior poliomyelitis. Bayliss has pointed out that Head's researches on the posterior root ganglia in cases of herpes zoster seem to show the existence of antidromic impulses in the posterior root fibers. Bruce, however, for the first time, gives an adequate explanation of the mechanism of the production of the eruption of herpes zoster by a lesion affecting these fibers. If the cells of the posterior root ganglia be irritated from hemorrhage or other causes, they will be capable of originating impulses which may pass in two directions, impulses which will pass centralwards, and cause intense pain, and impulses which will pass peripheralwards along the fiber and down the limb of the bifurcation which ends in a blood vessel, and there produce a dilatation. An extensive involvement of the ganglion will thus give rise to an extensive eruption, and a smaller lesion will be associated with a smaller eruption.

(Vol. X, No. 11)

1. Nerve Fusion and its Bearing on the Treatment of Infantile Paralysis.

HENRY O. FEISS.

2. Epilepsy and Rheumatism. J. CECIKAS.

1. *Nerve Fusion*.—The writer's conclusions are as follows:

1. Peripheral nerves containing degenerate fibers may, after local nerve distortion, show some change in central control in the sense that some of the residual fibers may make new connections with cord cells, but the anatomical nerve pattern below the scar remains much as before, few if any of the empty sheaths being refilled. Whatever new central con-

nections are made, the physiological and functional properties of all fibers must depend on the peripheral end organs of the sheaths which these fibers occupy.

2. Clinical observations after nerve anastomosis must exclude all improvement due to spontaneous recovery, massage or muscle training.

3. Basing my opinion on the authoritative experiments of others, and also on my own work on nerve fusion, I consider that there is, as yet, no sufficient experimental basis by which nerve anastomosis for the palsies of infantile paralysis can be justified.

2. *Epilepsy and Rheumatism*.—Epilepsy is dependent primarily on an individuality of brain which may be inherited or acquired. This dynamic change lies in a lowered tonicity of the brain, the motor area and the associations that bring about consciousness—the most active parts of the system—being the first to succumb to abnormal irritation. But even a highly predisposed brain would not give rise to such attacks without some definite lesion affecting it. Thus, in every case of epilepsy it is necessary (a) to discover the special cause of the epileptic predisposition of the brain, and (b) to determine, besides the localization, the nature and degree of the anatomical lesion. Many cases of epilepsy recover by simple trephining, perhaps as the result of the slight disturbance to the part; other cases, apparently in no way different, require removal of the surface of the motor area, and still others, identical in appearance to these, resist all such interference.

These and other facts seem to point to lesions of an inflammatory character, extending for a variable distance over the surface of the brain and passing into the substance for a variable depth between the elements of the brain which become impaired either in their nutrition or in their constitution. The course of this process may often be traced in each case by special features, and its nature indicated by kindred lesions in other organs.

Such conditions are particularly to be met with in cases following a rheumatic infection, of which the writer furnishes an example in a boy of 8 whose case history he reports in full. The patient's mother had migraine and an attack of subacute rheumatism. The patient had relapsing attacks of tonsillitis, followed by adenitis and endocarditis, and later by brain symptoms as follows: Attacks of aphasia. The first was pure, the second—a month later—was accompanied by paralysis of the right cheek; the third, a month later, again, by paralysis of the right face and right arm and convulsive movements in the right arm. After a short pause, the convulsions, in this third attack of aphasia, reappeared, spreading to the right lower extremity, which became paralyzed, then to the homologous left extremity, and then became general. When asked, during the attack, if he suffered, the boy laughed. Urine was not voided at the time. The convulsive attack did not return, and next morning the aphasia and paralysis had disappeared. Since the attack the child has shown no nervous symptoms but has remained feeble and restless. "He makes fearful jumps, heedless of danger, and what especially astonished people is that he laughs at everything and nothing, and is himself exasperated to find that he involuntarily passes urine on these and other occasions." The left plantar reflex is extensor.

The remainder of this article is largely argumentative. The patient's own affections and his maternal heredity comprised a group represented in the rheumatic family of diseases. The order in which the epileptic symptoms developed and the serial phenomena of inhibition and irritation

of the motor centers, of disturbance of the mimic motility and of perturbation of the psychical sphere, presented in an order of progression, point to a process which has impaired by degrees and at intervals the motor area and the deeper and broader associations of it through the corona radiata to the central ganglia and upon the system of afferent impulses. This supposition is proved to be true by a connective series of facts, namely, the relapsing tonsillitis, the adenitis which is evidence of the spread of infection to the lymphatic system, and the endocarditis which is the result of a blood distribution.

The article is concluded with this statement: meningitis may be caused by various microorganisms either primarily or secondary to some other primary lesion. Meningitis in its active state or by its sequelæ may cause epilepsy. The rheumatic type of meningitis is second to none in frequency in its capacity to cause epilepsy on account of its peculiar histological characters, and the diminution of tone in the affected brain; besides it is met with in after life in individuals originally feeble or weak, to say nothing of the close connection between rheumatism and nervousness which many observations tend to establish.

C. E. Arwood (New York).

Book Reviews

MANISCHE DEPRESSIVE IRRESEIN. Von Privat Dozent Dr. Edwin Stransky. Franz Deuticke, Leipzig and Vienna.

Dr. Stransky's work on the manic depressive psychoses is the most ambitious work that has thus far appeared on this subject. Taken all in all it fairly well reflects the Kraepelinian standpoint. The general delimitation of the idea with a short critical résumé of the historical development of the problems and Kraepelin's general position are given in the first ten pages. This is a limited space in which to develop the ideas thoroughly but Stransky has done pretty well with them. Necessarily he has omitted many historical details which would have been of value, particularly the work of Falret which might have been given prominence by quotation, instead of by simple citation.

The general symptomatology then follows, the depressed states being taken up first, followed by studies of the manic states. Mixed states, course and prognosis then follow. Later cyclothymia, and chronic depression are discussed; prodromal stages follow this with physical signs.

In the chapter on etiology very little is found beyond a repetition of the older points of view, namely, that the matter is a constitutional anomaly, that heredity plays a large part, and there the matter practically ends. Almost the only new suggestion that we find is the consideration given to vasomotor hypotheses put forward by the Vienna school of Van Noorden. Stransky does not discuss the psychogenic factors which psychoanalysis is showing to be of immense interpretative importance.

In the chapter on Differential Diagnosis we find no recognition of the separation from anxiety hysterias, although the general relationship to old-fashioned hysteria is discussed.

The largest portion of the work is given over to casuistic material, this taking up over a hundred pages. This we consider a great mistake in a work of this kind, because the material is not carefully analyzed, only the superficial anecdotal features are given. Three cases carefully followed through all of the phases would have been much more valuable than the plethora of casuistic material presented by the author. In this respect this work of Stransky's lags far behind that of Bleuler on dementia præcox. In Bleuler's work absolutely new lines were developed, new thoughts suggested, and new methods of interpretation stimulated, whereas the work of Stransky is formal, old-fashioned, literary and encyclopedic.

Notwithstanding this it remains the most exhaustive and authoritative of the valuable volumes on manic depressive psychoses. It is No. 6 of Aschaffenburg's Handbuch der Psychiatrie.

JELLIFFE.

HANDBUCH DER PSYCHIATRIE. Herausgegeben von Professor G. Aschaffenburg. Volume 3 of Special Portion. The Psychoses of Brain Diseases, by Professor E. Redlich. Franz Deuticke, Leipzig and Vienna.

Dr. Redlich, in this small volume of 100 pages, takes up the mental signs of brain tumor, thrombosis, encephalitis, Huntington's chorea, men-

ingitides, hemorrhage, softening and multiple sclerosis. It is a very useful summary of the mental changes that take place as a result of the processes outlined, and which cannot be entered more in detail in review.

ALIENISTES ET PHILANTHROPEs Par le Dr. René Semelaigne. Les Pinel et les Tuke. G. Steinheil, Paris.

One welcomes Semelaigne's return to the historic field. His earlier papers were full of interest and insight. He has here presented a work of 600 pages which is purely biographical and dealing with the history and development of several generations of the French psychiatrist Pinel and that of the family of Tuke. It is a book which does not lend itself to analysis, but will prove a landmark in the history of psychiatry.

HANDBUCH DER PSYCHIATRIE. Herausgegeben von Professor G. Aschaffenburg. Volume 5. Franz Deuticke, Leipzig and Vienna.

The fifth volume of this important handbook, former volumes of which have already been reviewed in our pages, contains two contributions, one on medico-legal psychiatry and the other on laws concerning the insane.

Both of these chapters deal with material of local value, namely, the German and Swiss codes. They will be of interest to lawyers rather than to physicians unless the latter have medico-legal inclinations. How far these codes are in advance of English and American jurisprudence with reference to the psychoses appears in a volume of this kind. It can be read to advantage from this standpoint if from no other.

JELLIFFE.

L'HYSTERIE. DEFINITION ET CONCEPTION—PATHOGENIE TRAITEMENT. Par le Dr. H. Bernheim, Professeur Honoraire a l'Faculté de Nancy. Octave Doin et Fils, Paris.

This work is an abbreviation of the author's more voluminous treatise written, or rather perhaps conceived, 20 years ago. It is just about that old and represents the stage of hysteria of that date, even to its criticisms of other authors. As to new things, points of view, attitudes of mind, etc., there are none. The work will be found admirable as a historical landmark or crystallization of an older point of view—essential in the development of modern thought but far from being it.

JAHRESBERICHT ÜBER DIE LEISTUNGEN UND FORTSCHRITTE AUF DEM GEBIETE DER NEUROLOGIE UND PSYCHIATRIE. Redigiert von Prof. Dr. L. Jacobsohn in Berlin. XVI Jahrgang. Bericht über das Jahr 1913. S. Karger, Berlin, 1913.

This indispensable review of the progress of neurology and psychiatry appears for the year 1912 in even greater size and completeness than ever before. In 1,600 pages there are bibliographical references of over 11,000 articles, all devoted to nervous and mental disease, the greater part of the more important ones being abstracted at length. The amount of labor involved in putting such a year's progress on record is colossal and the value to the active worker cannot be computed. Such an enterprise, as we have said many times in these columns, is worthy of the heartiest support.

JELLIFFE.

DIE PROSTITUTION. By Dr. Iwan Bloch. Volume I. Lewis Marcus, Berlin.

Bloch's works are pretty well known to our readers. His hypothesis concerning the post Columbian origin of syphilis has been given considerable attention by syphilographers, and his many works on various sexual problems have been translated into many languages.

His point of view being so thoroughly modern, one can expect from the present work on prostitution something more than an ordinary, casual, anecdotal type of handling the problem. Fortunately this expectation is gratified, for Bloch maintains that there is such a thing as a sexual science and that the scientific study of the sexual instinct is worthy of the most profound and exhaustive research, and that any attempt to handle the problem from the mixed standard, that is from the standards of medicine and religion, is bound to result in clouding rather than in clarifying the issues. He therefore adopts the point of view that the study of these situations is one for science, and science only, and that in sexual science, prostitution is one of the central problems.

Sexual reform has heretofore seemed to be the special appanage of religion, but Bloch is strongly of the opinion that unless the sexual sciences are regarded from the anthropological-ethnological viewpoint, no advances will be made. With this point of view we are heartily in accord, and the psychoanalytic researches of Freud and his students have definitely substantiated it.

Although Bloch may not be said to be a follower of Freud, still the point of view of Freud and his students receives justification and confirmation from Bloch's study of the prostitution problem. He sets for himself an immense program. In the first place he believes it necessary to describe anew the meaning of the word prostitution; that its narrow application to the limited series of actions on the part of a circumscribed number of individuals does not convey the proper idea of what prostitution really means. Prostitution and purity therefore are not by any means mutually exclusive terms. There are, according to Bloch, many prostitutes infinitely more moral from the sexual standpoint than many married women, and many marriages are nothing more nor less than legalized forms of prostitution. It therefore becomes highly important to state from a scientific point of view as to the meaning of the word and what it shall include.

The second interesting situation is that prostitution as a social phenomenon is a survival of a former state of culture. This point of view is thoroughly elucidated and forms one of the most interesting chapters in the book. This attitude of mind is developed from Bloch's biological studies concerning the origins of the rites connected with prostitution. Thus he shows the meaning of the Dionysian revels, the utilization of religious customs and rites in the sacred temples, where prostitution was a part of the religion and how such were utilized by the priestly class as a relief for certain strivings of society. He also develops at length the significance of the use of haschish, opium, betel, alcohol, perfumery, bathing, etc., in their relation to prostitution and the modification of consciousness,—giving to the temple rites the character of mysticism, ecstasy, magic, witchery, etc.

The economical side of prostitution is then taken up and its purely secondary character pointed out. This result is in direct conformity to recent work done by the Rockefeller Commission in New York, where it seems to have been proven that economics and prostitution are only related at second hand.

A further chapter is devoted to the modifications that have taken place in the attitude of mind towards prostitution from that of the classical times. The organization and differentiations remain much as in the Greco-Roman times, and Bloch's general attitude is best expressed by saying that what Neoplatonism represented in the history of intellectual culture is the present day attitude of culture towards the question of prostitution; that is to say, we have a Hellenic-Christian ideal which from the standpoint of present day culture is a survival, as already outlined. The struggle of Neoplatonism in the second to the fifth centuries with its gradual modification by Christian culture resulted in a new type of striving, so far as general cultural demands were concerned. So far as prostitution is involved no advance has been made beyond Neoplatonism.

Another point of great value and which will be read with much interest is Bloch's development of the idea of slavery and its relation to prostitution. Just as Neoplatonism represented a transition phase between the decay of the cultures of Greece and Rome not yet touched by the new principle of altruism found in Christianity, so the attitude towards slavery which was prevalent in Greco-Roman times has persisted to the present time particularly in the form of prostitution. The attitude towards the woman as property still persists in prostitution, so that the slavery of the Greco-Roman times is still with us so far as women and sensual demands are concerned. This receives its most striking parallel in the problem of prostitution.

Taken all in all the work has much to commend it. It is thoughtful, suggestive, modern, thorough, and altogether an advance over everything else of its kind. The second volume is to appear shortly.

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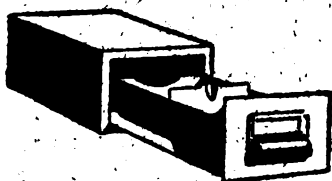
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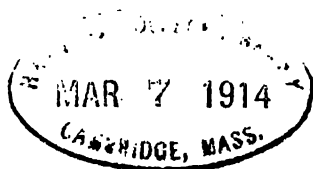
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Original Articles

SILAS WEIR MITCHELL, M.D., LL.D.

HIS PLACE IN NEUROLOGY

BY CHARLES K. MILLS, M.D.

The death of Silas Weir Mitchell on January 4, 1914, shortly before he had completed his eighty-fourth year, marked the passing of one of the most striking figures in American medicine. The name of Rush in our nation's early history and that of Mitchell in the chronicles of the last half century stand side by side in estimating medical achievement and position in this country. Born a little more than a half century after the birth of the nation and beginning his professional career a decade before the opening of the civil war, he is conspicuous in the most eventful and progressive period of our national history.

To others must be left the recital of the inspiring story of Mitchell's place in literature, science and civic affairs. In the brief time at my disposal a hastily prepared summary and appreciation of his work in neurology is all that I can hope to present. A more thorough and elaborate study of his neurological contributions is due to his memory and will no doubt be forthcoming in some volume dealing fully with his life work. The numerous honorary degrees bestowed on him by the great universities of his own and foreign countries and his admission to membership in those scientific societies both of America and Europe universally recognized as the bodies most capable of

estimating intellectual worth and achievement, were due in no inconsiderable part to his brilliant work in expanding and advancing the data and principles of neuro-physiology and neurology.

It will be impossible in a few pages to even outline and imperfectly estimate the contributions of Mitchell to neurology. These were chiefly along the lines of (1) clinical and pathological observations on injuries and diseases of the peripheral nerves; (2) physiological investigations of the cerebellum; (3) the therapeutics of the nervous system, especially as illustrated by his organization of the rest treatment and by his numerous additions to our knowledge of the use of drugs and of special methods of local treatment; (4) the establishment of new clinical types and the more thorough study of symptoms and clinical combinations recognized but not fully appreciated and expounded by others.

Mitchell received his degree at the Jefferson Medical College in 1850 when in his twenty-first year and soon began his well-known researches in physiology, comparative anatomy and toxicology, carrying these on in such time as he could secure from his work as a practising physician. As is well known, his earliest ambition was to make for himself a place as a physiologist. The study of the venom of serpents, of the action of vegetable poisons and of special points in the physiology of some of the lower animals, claimed much of his time and attention during the first ten years after graduation. While these investigations were not solely, nor chiefly, neurological, they contributed facts of value to the anatomy, physiology and toxicology of the nervous system. An interesting discovery which paved the way for others in the same direction was that of a laryngeal chiasm in chelonia similar to the optic decussation.

Throughout a large part of his long scientific and professional career Mitchell's mind continued to be fascinated by the question of the action of venoms. He recurred at intervals, alone or with others, to new studies in this field of research, his mind grasping the fact that in such investigations would be found data that would help to clarify some of the most obscure problems in physiology, sero-pathology and therapeutics. His latest work in this connection was done with Reichert in the Physiological Laboratory of the University of Pennsylvania, more than a quarter of a century after his first researches.

The events and opportunities of the civil war gave the first strong stimulus to Mitchell's purely neurological investigations and contributions. Early in the war he was appointed an acting assistant surgeon and began his duties in one of the large military hospitals in Philadelphia. Having especial interest in everything which related to the nervous system, and his fellow surgeons in the main inclining to the neglect of neural maladies, Mitchell soon had large opportunities thrown in his way. Wards for the study and treatment of wounds and diseases of the nerves and brain and cord were set apart for him in two large hospitals and in time a suburban hospital known in local and medical history as the Turner's Lane Hospital of Philadelphia, with accommodations for several hundred cases, was almost entirely given over to the study of injuries and diseases of the nervous system, the work along this line being left almost exclusively to Drs. Mitchell, Morehouse and Keen. The special contributions and the monographs which grew out of the work at this hospital are now well known and need not here be recited in detail.

It may add interest to this sketch to give a brief citation from Mitchell's own reminiscences of this early but invaluable experience: "The opportunity was indeed unique and we knew it. . . . Thousands of pages of notes were taken. There were many operations and frequent consultations. About midway we planned the ultimate essays which were to record our work. There was a small book on Neural Injuries full of novelty, a short essay on Reflex Palsies, etc. One of the most notable was Keen's essay on Malingering. Others on Epilepsy, muscular disorders and on acute exhaustion were never written because of accidental destruction of notes by fire."

Out of this work during the time of war proceeded not only the original monograph and separate essays of Mitchell, Morehouse and Keen, but the later expanded and thoroughly systematized volume of Mitchell in 1872 on "Injuries to Nerves and their Consequences" and Dr. John K. Mitchell's book reviewing the remote consequences of these nerve injuries from a study of the condition of some forty of the survivors. Forms of neuritis, trophic disorders and symptoms like causalgia, hitherto undescribed, the physical and psychic phenomena presented by those who had lost limbs through amputation, and various methods of treatment particularly adapted to nerve injury were here, with a

wealth of other detail and suggestion, first brought to the attention of the profession. Mitchell's keen interest in the study of peripheral nerve phenomena remained with him throughout his career and led to some of his most important contributions. He was a pioneer in the minute study of cutaneous nerve supply, in this respect in not a few particulars forerunning the work of Head and his collaborators and contemporary investigators. In one of his papers published as early as 1873, he showed that our views as to cutaneous sensory supply, founded largely upon anatomical observations, needed to be thoroughly revised. He found, to use his own words, that surface anatomy was a fiction. Mitchell showed by his own observations, citing also those of Letievant and others, that section of the median or other nerve trunk did not completely annihilate sensibility in distribution of the nerve according to the usually accepted anatomy. He recognized clearly the fact of overlapping nerve areas and the main distinctions between what have since been called protopathic and epicritic sensibility, also various erroneous ideas as to regeneration of nerves and much else that has since been seen and added to by others. His first work in this direction done as early as 1873 was followed by other papers during ten or more years.

The researches of Mitchell on the physiology of the cerebellum placed him in line as an experimentalist with distinguished contemporaries and predecessors in this field. These investigations, with such time as he could command from his duties as a medical practitioner, were continued over a period of six years, from 1863 to 1869. In the résumé of his work and results in the *American Journal of the Medical Sciences* for April, 1869, he shows in the first place that he was thoroughly familiar with all that had been done from the time of Rolando to the publication of his article,—with the work of Flourens, Lussana, Bouillaud, Serres, Wagner, Magendie, Brown-Séquard, Vulpian, Luys, Richardson, Longet, Dalton, and others.

His experiments, which were performed upon pigeons and other birds, and upon rabbits and guinea pigs, were mainly of three sorts, namely, ablation, partial or nearly complete, freezing with rhigoline spray, and injections of globules of mercury into selected portions of the cerebellum. He also produced irritations by directly applying cantharides to exposed parts, or by penetrating the organ with an awl-shaped instrument. He ablated the

cerebellum eighty-seven times and performed two hundred and sixty experiments on the influence of irritants. The results of these investigations are of course well known. They were in some measure confirmatory and in some antagonistic to those obtained by others. It was a matter of surprise to me that in the symposium on cerebellar symptoms and localization at the recent London congress, little was said with regard to Mitchell's work. It is true that the view at which he arrived, that the cerebellum was an organ of reinforcement to the spinal cord and other parts of the nervous system, has not been adopted and was even questioned by Mitchell himself in the light of later attention to cerebellar functions, but his paper nevertheless stands as a monument of original work, valuable for the actual data obtained and for the suggestions springing out of these. In a certain degree he anticipated Luciani's views as to the results of irritation of the cerebellum, and he clearly recognized the compensations by other parts of the nervous system for the losses in function the result of experiments causing deficit.

Mitchell is one of the few neurologists to whom well deserved fame has come because of his contributions to therapeutics. Foremost in this connection is of course that organized system of therapeutics usually spoken of as the Rest Treatment. One can scarcely realize at this time both the wide attention and the opposition which his advocacy of this treatment at first received. The value in cases properly selected of the physical measures included in this treatment,—seclusion, rest in bed, full feeding, with such adjuncts as massage, systematized movements, and electricity,—is now generally recognized, although the treatment was for a not inconsiderable time regarded by a large proportion of the profession not only as revolutionary but also by some as foolish or even harmful.

The psychic element in the treatment, which was fully understood by Mitchell himself, has not received due recognition, and some of the propagandists of modern psychoanalysis have denied all virtue to the treatment because of what seemed to them to be this lack. Mitchell was indeed one of the greatest of our psychoanalysts, although he was not given to prolonged, perplexing, and confusing methods of searching for doubtful causes in the sexual incidents of the early childhood or infancy of his patients. In this as in so many other matters of practical medicine, untram-

meled by unnecessary and handicapping hypothesis, gifted with insight and confident in his own resources, he saw into the heart of nervous maladies. He was a sound exponent of the necessity of building the body while influencing the mind.

His first publication in book form of the rest treatment was in 1877 under the title of "Fat and Blood." This was preceded during several years by papers leading up to it on the milk diet and on rest in the treatment of special forms of disease. He had also given to the world in popular form his views in his brochure on "Wear and Tear."

In many minor but not unimportant ways Mitchell added to our knowledge of the use of drugs and other remedies, as in his observations and investigations on morphine and atropine, his recommendation of nitrite of amyl to abort epileptic attacks, his suggestion of lithium bromide as the most valuable of the bromine salts, his recommendation of the use of splints to procure local rest, and the employment of ice and sprays to reduce pain and relieve local spasm. He was among the first to promote the rational use of massage and faradic electricity, and he made numerous valuable suggestions as to surgical procedures like nerve section and nerve stretching, at a time when such suggestions had the merit of originality.

Time and again Mitchell directed the attention of neurologists to new clinical types, as to post-paralytic chorea in 1874, his description of this complex being the precursor in some respects of later published observations on cerebello-pedunculo-rubral disease. Some of his important contributions were collected in his "Lectures on the Nervous Diseases of Women" in 1881, and his "Clinical Lessons on Nervous Diseases" in 1895.

The rare vasomotor neurosis, erythromelalgia or Mitchell's disease, was first fully described by him in a paper of unusual merit in 1878, although as early as 1872 he had called attention to the chief features of the disease, and continued its study in later papers.

With a mind always plastic and responsive, Mitchell, like some great men in pure science, Faraday for instance, when engaged in a physiological or clinical investigation, with every step taken saw new radiations of the subject in hand. One observation or discovery indicated to his alert mind other possibilities. This is illustrated in many of his studies which had a tendency to

follow each other along expanding lines, as in those on the affects of accidental or surgical nerve section, on the psychic phenomena shown in cases of amputation, on the influence of barometric and other weather conditions in nerve injury and disease, and in his elaborate research with Morris Lewis on the physiology of the knee jerk and muscle jerk.

Mitchell's place as neurological investigator and writer cannot, however, be estimated by a mere enumeration of his contributions with brief glances at their main features. His work needs detailed consideration and full analysis. Brilliant suggestions and important deductions are often to be found in a sentence or paragraph.

The abilities of Mitchell as a psychoanalyst and student of nervous phenomena are shown in many of his delineations of character and recitals of incident in his works of fiction, as in his early novel, "In War Time," in "Characteristics," in "Dr. North and His Friends," in "Constance Truscott," in magazine articles involving such subjects as dual personality, and in much else that he wrote outside of his more formal and technical writings in the field of medicine.

Dr. Mitchell was not a promiscuous and over-frequent attendant upon medical societies, but he gave his attention to a chosen few, as the College of Physicians of Philadelphia, the Association of American Physicians, the Association of Physiologists, and the Philadelphia and national neurological societies. In the transactions of the College of Physicians of Philadelphia some of his best work, neurological and otherwise, is to be found. What he did for this great medical association and library will be told by others. To him more than to any other man it owes its present high position. As a member of the library committee of the college, with Dr. Dercum who was for many years associated with him on this committee, he was instrumental in adding many valuable neurological text books, treatises, monographs and journals, foreign and American, to the library collection.

Mitchell was one of the thirty-five original members of the American Neurological Association. The letter calling together the initial meeting for the formation of this association was dated December 15, 1874, and was signed by William A. Hammond, Roberts Bartholow, Meredith Clymer, J. S. Jewell, E. C.

Seguin, James J. Putnam and T. M. B. Cross. In this letter it was proposed to hold the first meeting on June 2, 1875, in New York city. Dr. Mitchell was one of the twenty-eight men to whom this letter was sent and as he accepted he became one of the original members. He did not attend the first meeting, June 2-4, but the committee on nominations named him for the office of president. He declined the honor and the first vice-president, Dr. Jewell, was elected to the office of president. In 1895, having been an active member of the association for twenty years, Mitchell was proposed and later unanimously elected honorary member. He was elected president of the association for the year beginning May, 1908. He presided at the annual meeting and read an address of much interest chiefly concerned with the discussion of neural energy. He was then in his eightieth year.

The writer with several colleagues having made plans for the organization of the Philadelphia Neurological Society, Mitchell on January 28, 1884 was chosen the first president. He held this position continuously from 1884 to 1890, constantly promoting the proceedings of the society by his presence, his work and his suggestions.

From time to time during the entire history of the society he contributed papers and presented or reported cases of much interest and value, drawing his material chiefly from his large private practice and the public service of the Orthopedic Hospital and Infirmary for Nervous Disease. It was at this hospital, which was at the time opposite the buildings of the University of Pennsylvania on Ninth Street, that I got my first glimpse of Mitchell working with his assistants on the study of patients coming to the out-door service. Even as an undergraduate student, I was impressed by his remarkable personality and his skillful clinical methods. This hospital and infirmary was established in October, 1867, at 15 South Ninth Street, in rooms over the shop of Kolbe, a dealer in medical instruments. Its neurological department designated as the Infirmary for Nervous Disease was opened in 1870 with Mitchell in charge. The hospital was removed to its present location, the northwest corner of Seventeenth and Summer Streets, in 1872. Mitchell continued his connection with the infirmary as attending physician and consultant until the time of his death. Here he gathered around him as years progressed able coadjutors and assistants. Some of his

best papers written alone or in collaboration had their origin in the rich out-door and in-door services of this justly famous institution. Here he gave many of his delightful conversational clinics and conferences, some of which I had the pleasure of attending and out of which sprang the valuable collection of neurological essays included in his "Clinical Lessons."

In 1884, Mitchell served with Dr. H. C. Wood and the writer as consultant to the Insane Department of the Philadelphia Hospital, and although this service was brief, he did much in the way of pointing out the shortcomings of the institution at the same time indicating the best methods of remedying these and of improving the condition of the unfortunate insane who, then as now, were too much crowded for their comfort and scientific treatment.

Mitchell was instrumental in founding a ward for nervous diseases in the Presbyterian Hospital of Philadelphia, he acting as consultant and Dr. John K. Mitchell taking charge. He did much towards maintaining this ward besides giving his invaluable service as a neurologist. At the time of the foundation of the hospital he suggested the pavilion form of construction, knowing of its advantages from his Civil War experience. For some years, in the seventies, he was physician to this hospital.

When the opportunity came to me in 1877 to start a department for nervous diseases in the great charity hospital of Philadelphia and numerous obstacles were thrown in my way, I received from Dr. Mitchell, whom I consulted regarding the matter, such support and encouragement that I went forward with the project. He had before me seen the great value of the neurological material which was going to waste in the Philadelphia Hospital, but had not been able to accomplish his wish to turn this material to good use. He always took great interest in the clinico-pathological studies in cerebral localization and all forms of neurological work at this hospital.

As a trustee of the University and as one always interested in everything which tended to advance neurological science and practice, Mitchell gave his continuous sympathy to the development of the department of neurology in the University of Pennsylvania. The improvement and expansion of the hospital service, the work of the laboratory of neuropathology, the collabora-

tion between the neurological and surgical departments, and the publication of annual and biennial volumes of Contributions all received his hearty endorsement and encouragement.

Mitchell was offered more than one professorial position. He sometimes told the story that he was professor in the University for a minute or two, having been elected while absent from the room by his colleagues of the trustees of the University of Pennsylvania to a chair which he resigned as soon as the fact was made known to him. For a short time he held a chair in the Philadelphia Polyclinic and did some post-graduate teaching in nervous diseases to Polyclinic and other students who sought his clinic at the Infirmary for Nervous Disease. The opportunities of this clinic were always hospitably given to the physicians of Philadelphia or to those visiting the city.

Unlike some men in science and medicine, Mitchell never feared that others might take advantage of what he knew or thought. He was generous in giving knowledge, and in affording assistance, this generosity showing itself not only in his willingness to help in matters of science, but extending also to giving personal help to those whom he believed needed and deserved such assistance. Just how much was owed to him by young physicians and especially those ambitious to pursue neurology can never be fully known. To those neurologists, who like myself are residents of the community in which Mitchell's long and useful life as a physician was largely spent, he was an ever present example and inspiration. Poor indeed was he in spirit who did not get something of value from contact with this master in medicine, this man among men.

THE CEPHALOGRAPH A NEW INSTRUMENT FOR RECORDING AND CONTROLLING HEAD MOVEMENTS

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The value of graphic recording methods is well appreciated by all physiologists and psychologists. When the physiologist or psychologist turns from laboratory to clinical work, he feels acutely the lack of such methods. The absence of methods of graphic recording suitable for clinical use is due mainly to the delicacy and to the complicated nature of much of the recording apparatus which is used in laboratories; and it is regrettable, not only because of the great diagnostic, but also because of the great therapeutic value of graphic records. There is a large, almost unutilized field of therapy which is based upon that fundamental property of nervous structures which Kraepelin has called *Übungsfähigkeit* (training capacity). This field has hitherto been used only in neurological disturbances, such as locomotor ataxia. It is, at least, as available for the treatment not only of other neurological conditions, but also of many psychoneurotic symptoms.

Thus, Gutzmann has shown in his work on speech disturbances, that graphic records of abnormal, greatly facilitate the acquisition of normal, muscular movements. Where all verbal explanations fail to induce improvement in a patient's efforts, the demonstration of the curve of a normal movement, the pointing out of the faults in the graphic record of the patient's own move-

ments, and the constant demonstration by the graphic method of these faults as they arise, quickly teach the patient to acquire correct movements. The normal movements thus taught by visual guidance and conscious effort, later, by practice, become habitual.

To watch a pen recording one's movements is an excellent way to fix one's attention upon those movements. If the attention wanders for a moment from the task, the lapse is written and the attention is thus at once recalled.

If graphic records are to be available for clinical use, the apparatus which produces them must fulfill certain conditions. It must not be too delicate, too easily deranged. It must not require lengthy preparation before use. It must, therefore, be easy to handle, yet it must be sensitive. The recorded tracing must always be visible in order to show the patient his faults at the moment they occur, and the apparatus must be capable of recording for prolonged periods without requiring constant vigilance in adjustment. Only with such a machine can clinicians avail themselves of the value of graphic records; only with such a machine can a patient obtain the exercise necessary to learn fine movements.

We have constructed upon these principles a clinical instrument to record graphically a certain set of muscular movements which experience has shown us to be of greater importance than is generally recognized. The movements we refer to are those oscillations about a vertical axis of the upright standing or sitting body, oscillations which, when exaggerated, are known as Romberg's phenomenon. Most clinicians have recognized the importance of ensuring to the tabetic a safe, steady, upright attitude. Without such static stability, a tabetic cannot move securely or coördinately. Hence, exercise therapy, to procure steadiness of the upright trunk and head, has been applied in tabes.

But it is not only in gross neuropathological states that swaying occurs. Vierordt and Leitesdorfer have shown that no normal person can maintain an absolutely immobile standing or sitting posture. The standing or sitting body is constantly in labial equilibrium; it is only relatively at rest. Leitesdorfer demonstrated oscillations of the head and trunk, even in German soldiers specially trained to immobility. These movements are not detectable by the eye, but can be graphically recorded. Their extent is astonishing. Graphic curves of these movements are

called swaying figures (*Schwankungsfiguren*, Vierordt); and if recorded from the head, cephalograms (*Leitesdorfer*). *Leitesdorfer* has further demonstrated that the direction of these oscillations usually shows some relation to the direction of the attention. Attitude is largely a reflex emotional expression. Movements of the head and trunk are habitually used to express emotion. We need only instance the forced movements of persons enduring pain; the posture of the melancholic; the gestures of the animated; to emphasize the inseparable connection between muscular movements and emotion.

This interrelation of muscular action and emotion enables us to teach the control of the emotions through training the control of the muscles. Our instrument is designed to educate persons in controlling their head and trunk. The head segment largely governs the other body segments. Training of the musculature of the head and neck confers a marked degree of control over the rest of the body muscles.

Our instrument (*Fig. 1*), which we call the cephalograph, records graphically the movements of the head, in two dimensions, in the sagittal, and in the frontal planes. It consists of a helmet, which is put on the head of the patient. The helmet is devised so that it can be made accurately to fit all heads. This helmet carries on its top a vertical rod, the helmet lever, which forms the first arm of a five-arm system of levers. Every movement of the head, in a sagittal plane, moves the first, or helmet lever arm, in the same plane. This movement is so transmitted through the lever system to the fifth, or recording lever arm, that the recording lever arm is moved vertically. The joints at which the lever arms turn are all formed by pivots and pointed screws to allow fine adjustment and to procure sensitiveness.

The system of five lever arms is set in a horizontal subframe. This subframe is suspended at its anterior and posterior ends, by means of pointed screws and pivots, within the main frame, a larger horizontal frame, so that the subframe, with the whole lever system, can rotate in a frontal plane around a sagittal axis. A movement of the patient's head from left to right, or from right to left, must, therefore, lead to a corresponding movement of the recording lever arm. Any movement of the head either in the frontal or the sagittal plane, or in both planes, produces a characteristic movement of the recording lever arm. In the

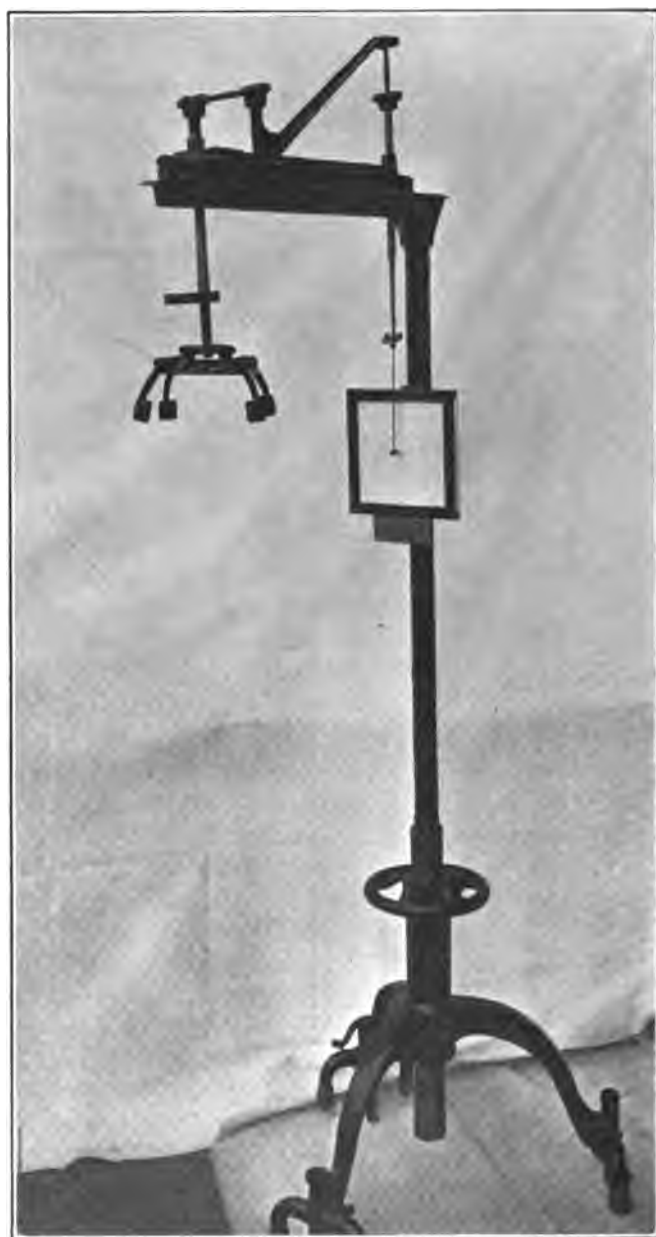


FIG. 1.

main frame, at the end remote from the helmet, is a large circular hole, which fits upon the upper end of a stout vertical steel tubing shaft. The main frame is thus joined to the supporting shaft at a right angle. At this joint, the main frame can be rotated around the shaft. The vertical supporting shaft is screwed into a cast iron tripod. By means of a winding wheel, the shaft can be raised or lowered within the tripod, so that the apparatus may be adjusted to the height of the patient, and may be used by patients standing or sitting. Each limb of the tripod is furnished with small wheels so that the whole apparatus can be readily wheeled about. The wheels can be elevated from the ground by means of small levers, when complete immobility of the apparatus is desired.

The recording lever arm hangs just before the patient's face and carries a small glass tubular pen, which writes on a glazed white paper chart with a special ink that leaves no residue on evaporation.

The chart is square (Fig. 2). Upon it, eleven concentric, equidistant circles are printed. The chart frame is made of wood, and has a back which is kept in apposition with the frame by means of springs. When the back is pressed, the chart is easily inserted in the frame; and when the pressure is removed, the force of the springs enables the back to hold the chart immovably in the frame. The frame is fixed upon the front of the vertical supporting shaft; and by means of screws, can be tilted forwards or backwards, and raised or lowered.

Method of Using Apparatus.—The patient is seated in a chair without arms. The winding wheel is turned until the height of the horizontal frame is such that the helmet can be adjusted to fit the head accurately. The writing point of the pen should now be in the center of the innermost circle on the chart. If it is too high or too low, the chart frame is raised or lowered. If it be to the right or to the left of the center, the *adjusting weight* upon the first lever is rotated. When it is in the center, then a small lever which holds the pen off the chart, is released, and the pen writes.

The patient is now enjoined to make no movement with his head, and to keep the pen always in the center. Even in healthy people, the pen will never be at complete rest, but will continuously deviate from the center in pendulum-like movements.

Normal individuals may be able to keep the pen always within one of the innermost circles. In organic disturbances of the central nervous system, such as locomotor ataxia, and in many of the psychoneuroses, especially in all kinds of tics, the chart will soon be covered with lines of characteristic shape and direction. In the treatment of morbid conditions, the patient is systematically exercised, and taught to control the excursions of the pen. He endeavors to keep the pen within an ever smaller circle. We have invariably found that patients learn easily and quickly to suppress the abnormal movements of the head, with the aid of this apparatus. In tabetics, for instance, a safe, steady, upright attitude is often obtained in a surprisingly short time.

One great value of the apparatus can only be touched upon here. We have long been interested in the question, which voluntary muscular contractions (*Einstellungsbewegungen*) exert the greatest influence upon the will-sphere. We think that no other action is more effective than the active, tonic tension of the head supporting muscles of the neck. We have used this action in the treatment of psychoneurotic fears and obsessions. The influence is so powerful that the patient may even fall, after practicing this action for some time, into a light hypnotic state.

The cephalograph was made for us by the Medical Machinery Company of Detroit, Michigan.

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EXPERIMENTAL STUDY OF INTRANEURAL INJECTIONS OF ALCOHOL¹

BY ALFRED GORDON, M.D.

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Injections of alcohol into peripheral nerves has become a common practice in dealing with certain affections of nerve trunks. Variable results have been reported from such a procedure. In not a few cases permanent damage has been done to the tissues supplied by the injected nerves. Such, for example, has occurred in sciatica. As the method of injecting alcohol into nerves is at present somewhat in vogue, it appeared to me interesting to ascertain experimentally the histological effect of alcohol on nerve tissue when it is brought in direct contact with the latter. Similar work had been done by only three observers, viz., Finkelnburg in 1903, Brissaud in 1906 and May in 1912 (see below). Unfortunately it is difficult to draw definite conclusions from the experiments of these writers in view of the lack of uniformity in their work. The strength of the alcohol and the amount of alcohol injected were not equal for every animal. Moreover there was an uncertainty as to the degree of penetration of the fluid into the nerve tissue. Some of the authors (Brissaud and Finkelnburg) experimented on mixed nerves only and none experimented on a purely motor nerve.

The present paper deals with histological and corresponding functional results obtained from injections of alcohol into motor, sensory and mixed nerves. Precautions were taken to observe strict uniformity in all details of the procedures: the same strength of alcohol (80 per cent.), the same number of drops (five), the same degree of penetration of the needle into the substance of the nerve, the same dissection and exposure of the nerve trunks, the same after-care of the wounds, and finally the same species of animals, viz., dogs.

¹ Read before the American Neurological Association, May 5, 6 and 7, 1913.

The experiments were divided into two series: one series of three dogs were kept alive nine days, the other series of three dogs lived twenty-nine days.

The facial, infraorbital and sciatic nerves were experimented upon.

The first was traced to its intramedullary course. The other two were removed with their respective ganglia (Gasserian and spinal).

Chloroform was used for general anesthesia during the dissection and for putting the animals to death. No unnecessary suffering was therefore inflicted upon the animals.

FIRST SERIES: INFRAORBITAL NERVE WITH GASSERIAN GANGLIA,
FACIAL NERVE AND MEDULLA, SCIATIC NERVE AND
SPINAL GANGLIA

Infraorbital Nerve and Gasserian Ganglion.—Dog 1: Chloroformed. The nerve was dissected below the lower ridge of the orbit. The injection was made into the nerve itself. Wound rapidly closed up. Dog was taken the best care of during the following nine days. Hypesthesia at first and from the third day anesthesia over the area of distribution of the nerve was present during this entire period. The wound healed by first intention. The dog was then given chloroform until it died. The infraorbital nerve and the Gasserian ganglion were dissected and placed, first specimen in Müller's fluid and second specimen in 10 per cent. of formalin. At the end of three days the ganglion was put in alcohol (95 per cent.) for twenty-four hours, in absolute alcohol for twenty-four hours, in equal parts of ether and absolute alcohol for twenty-four hours, in celloidin and finally cut. The stain used was thionin. Microscopical examination shows some alterations. While the majority of the cells are found intact, nevertheless some of them present distinct chromatolytic changes: the cell protoplasm has largely disappeared, the nucleus and nucleolus are in some cells well stained, in others they appear very pale, in a few of the cells protoplasm and nucleus are wanting; the intercellular substance appears not to have undergone any change; the capsule of each cell is well preserved and well outlined in the large majority of the cells.

The infraorbital nerve remained in Müller's fluid six weeks. It was prepared for sections in the usual manner. The stains used were: Marchi's osmic acid, Weigert's hematoxylin and hematoxylin with eosin. The following changes are observed. All the large bundles of the nerve are found intact. The chief pathological changes are in the perineurium and endoneurium:

thickening and a very marked accumulation of cells are seen within and around the perineurium. The endoneurium presents in some places quite a dense tissue. The intima of some of the blood vessels of the perineurium is thickened. The thickened connective tissue with the proliferation of cells is seen in some sections especially around and in the vicinity of the smallest bundles of nerve fibers. As to the nerve bundles themselves, only occasionally is seen a mild degeneration of a *nervus nervorum*.

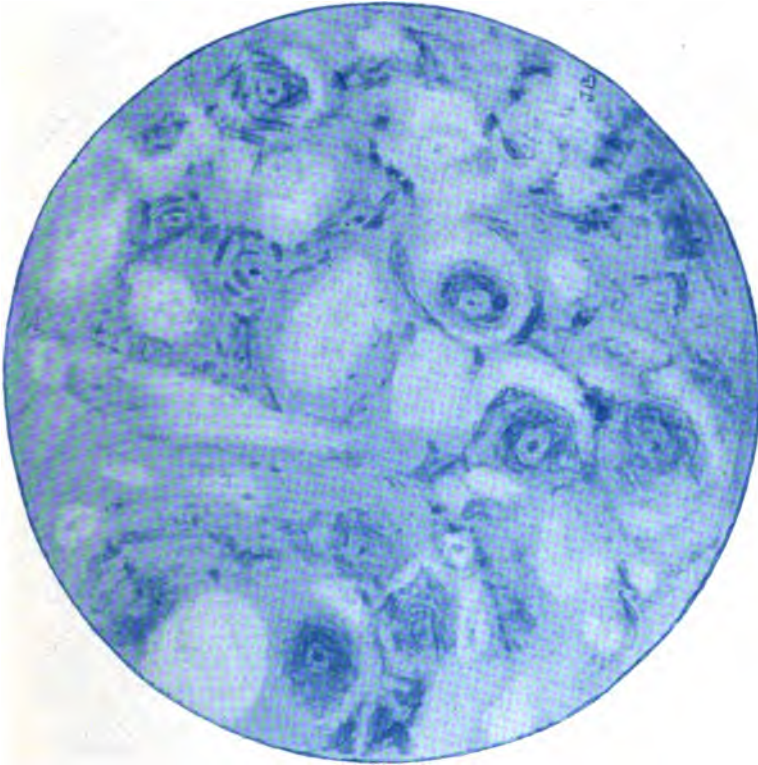


FIG. 1. Dog I. Gasserian ganglion. Dog lived nine days. Chromatolysis of some cells. Majority of cells well preserved.

Facial Nerve and Medulla.—Dog 2: Chloroformed. The nerve was exposed by dissection immediately behind the ramus of the upper jaw and an injection was made into the nerve trunk. Facial palsy was instantly produced. At the end of nine days while the facial palsy was still evident the dog was put to death with chloroform. The facial nerve was carefully dissected from the periphery to its point of emergence at the pons. The latter with the medulla was placed in Müller's fluid for three months,

the facial nerve for six weeks. The course of the facial nerve in the medulla and its nucleus were traced and carefully examined; no alteration could be detected. The peripheral trunk of the nerve in its portions above and below the point of injection of alcohol was found unaltered.

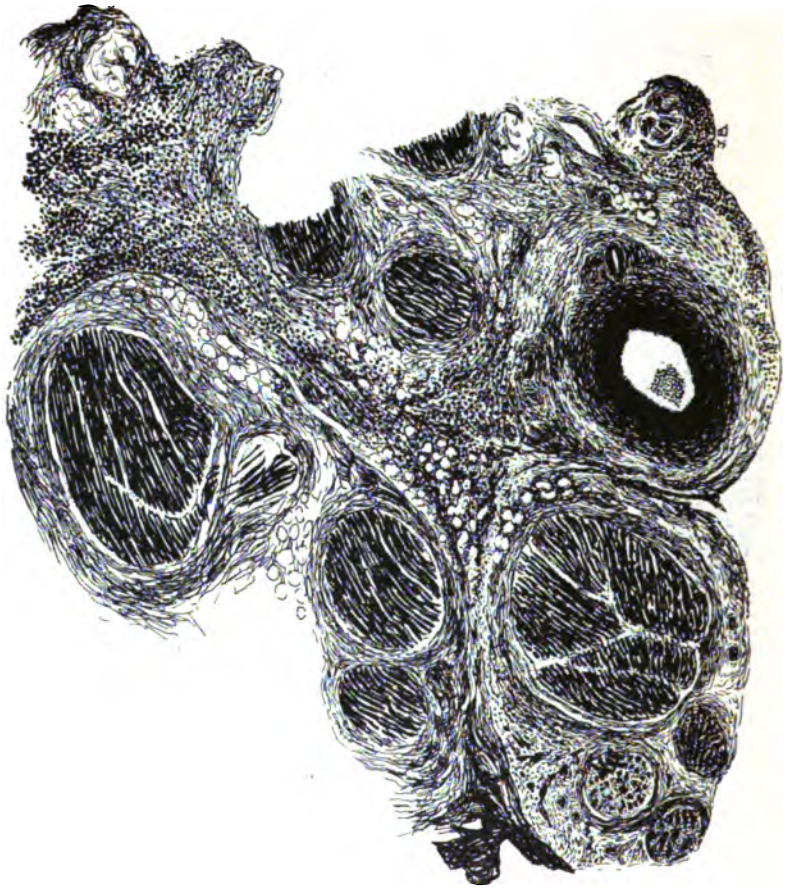


FIG. 2. Dog I. Infraorbital nerve. Dog lived *nine* days. Perineuritis near small nerve-bundles. Accumulation of round cells within and around the thickened perineurium. Intima of some blood vessels thickened. Large nerve-bundles intact. Degeneration of *nervi nervorum*.

Sciatic Nerve and Spinal Ganglia.—Dog 3: Chloroformed. Dissection of sciatic nerve on the upper portion of the thigh. Alcohol injected into the nerve trunk. For nine days the dog was kept under close observation. He was evidently suffering

from some paresthesia or discomfort in the leg, as he kept on continuously rubbing it. At times he would suddenly start biting or licking the leg; evidently he had pain. When he was made to walk, a limp was distinctly seen. The power was less marked on the operated than on the opposite side. The entire limb was hyperesthetic. Such was the condition of the leg during the nine days of his life. He was put to death with chloroform. The



FIG. 3. Dog. III. Sciatic nerve. Dog lived nine days. Perineuritis. Degeneration of nervi nervorum.

nerve was dissected up to the lumbo-sacral root and a spinal ganglion was removed at the same level. Hardening and fixation were done in the same manner as in previous experiments. The ganglion was found slightly altered, beginning vacuolation and slight chromatolysis in some cells were observed. The nerve itself presented some thickening of the perineurium. In the latter is seen occasionally a very small nerve bundle (nervi nervorum) undergoing degeneration. The condition is about the same as in

the infraorbital nerve except to a lesser extent. The larger nerve bundles, as well as the smaller ones, remained intact.

SECOND SERIES OF EXPERIMENTS

Infraorbital Nerve and Gasserian Ganglion.—Dog 4: Chloroformed. Dissection of the nerve and injection of alcohol as in Dog 1. The animal was kept alive twenty-nine days. During



FIG. 4. Dog IV. Gasserian ganglion. Dog lived 29 days. Chromatolysis of the majority of cells. Stain poorly taken by some cells. Proliferation of round cells originating in the capsule of ganglionic cell are seen in and around the latter.

this entire period sensations to touch and pain were repeatedly tested over the area of distribution of the nerve. Anesthesia was absolute. The Gasserian ganglion presents quite pronounced changes: the majority of cells are very lightly stained (they are pale); the nucleus with nucleolus is absent; some of the cells are entirely empty; there is a very extensive proliferation of cells



FIG. 5. Dog IV. Infraorbital nerve. Dog lived 29 days. Perineuritis. Abundance of round cells: they surround each nerve-bundle and the blood vessels. Areas of degeneration seen in the peripheral portions of nerve-bundles.

which probably originated in the capsule of the ganglionic cells; these small bodies are either located in the periphery or within the ganglionic cell; in the latter case they may fill out the entire space; they are also seen in abundance in the intercellular spaces of the ganglion.

The infraorbital nerve presents the following changes. The nerve bundles do not stain uniformly: some fibers stain darker than others; very small areas of absent fibers are seen in the large bundles and only near the periphery of the bundle; evidently they

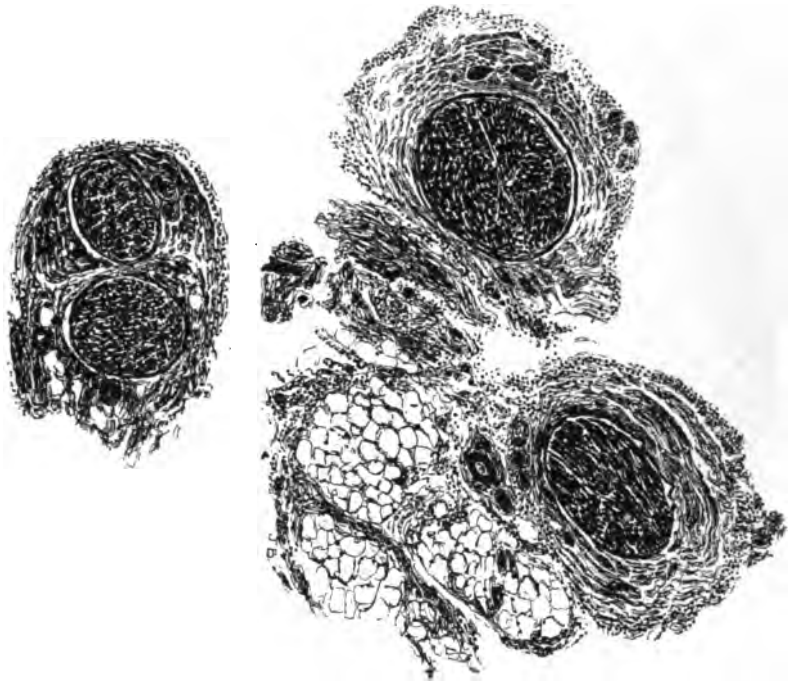


FIG. 6. Dog V. Facial nerve. Dog lived 29 days. Some thickening of the perineurium. A slight layer of round cells at the very periphery. Around some nerve-bundles young fibers of connective tissue are seen. Nerve-bundles intact.

are areas of degeneration. The most important changes are observed in the perineurium. While the thickening of the latter is moderate, the perineurium is surrounded and filled by round cells in abundance; each individual bundle is surrounded by such cells; they are particularly crowded in the thickened portions of the peri- or endoneurium. The blood vessels also show pathological changes: the adventitia is considerably thickened and the above-mentioned cells are especially abundant, inasmuch as they form

a thick layer around the outer membrane of the artery and even thicker than the latter.

Facial Nerve and Medulla.—Dog 5: Chloroformed. Facial nerve exposed like in the preceding experiment and injection made. Animal was kept for twenty-nine days. The facial palsy began to retrocede at the end of the twelfth day and completely disappeared on the twenty-fourth day. Dog was put to death with chloroform. The nerve and medulla like in the preceding

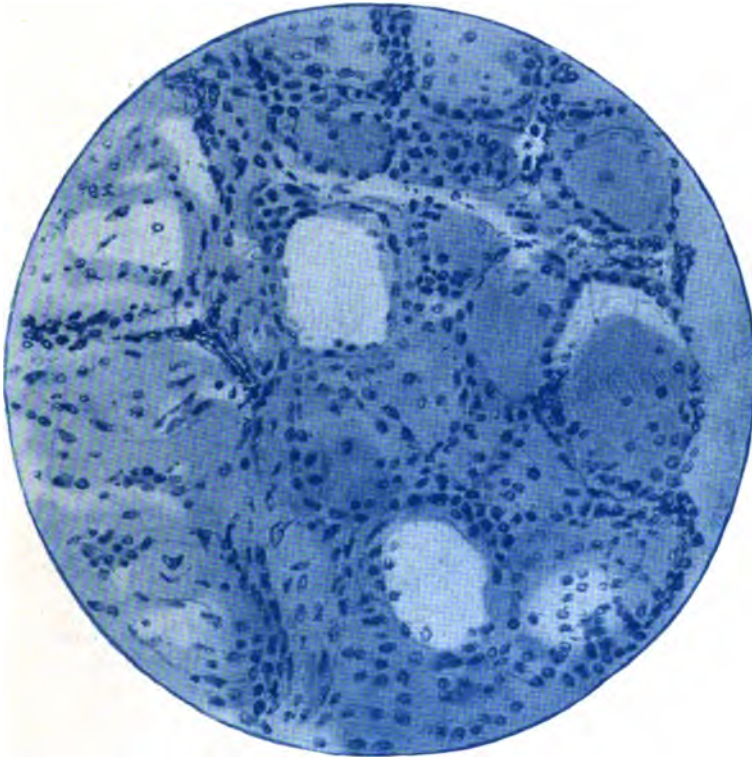


FIG. 7. Dog VI. Spinal ganglion. Dog lived 29 days. Chroma-lysis in the majority of cells. Stain faint in some cells. Accumulation of round cells in, around and between the ganglion cells.

case were kept in Müller's fluid six weeks and three months respectively. No changes were observed in the intrabulbar pathway of the facial nerve or in its nucleus. As to the nerve-trunk itself, slight thickening of the perineurium and at the very periphery a thin layer of round cells is seen. There is not the density of the connective tissue observed in case 1. Around some nerve-bundles the perineurium is normal, around others a

mild degree of perineuritis is observed. Around a very few nerve bundles the perineurium is found normal in thickness, but its individual fibers are very thin, scattered, and appear to be fragmented. They are probably young fibers pointing to a regenerative process. A very thin layer of round cells surrounds this young perineurium. The nerve bundles themselves are found throughout entirely normal. Likewise the nervi nervorum do not show in several sections the least change. The vasa nervorum are intact.

Sciatic Nerve and Spinal Ganglia.—Dog 6: Chloroformed. Dissection of the nerve and injection of alcohol into it like in Dog 3. Motor and sensory phenomena at first about the same as in Dog 3, but on the fifteenth day, areas of total anesthesia



FIG. 8. Dog VI. Sciatic nerve. Dog lived 29 days. Thickened perineurium, epineurium and endoneurium. Marked degenerative changes in the nerve-bundles.

could be detected along the inner and outer aspects of the leg. The loss of power gradually increased toward the end although there was no total paralysis. Some wasting of the muscles was evident and this gradually increased. Moreover, ulcerations of the skin began to be noticeable. On the twenty-ninth day the animal was put to death with chloroform. The entire sciatic nerve up to the lumbo-sacral roots and a spinal ganglion at the same level were removed and prepared in the usual manner for microscopical study.

The spinal ganglion was found profoundly altered: some cells were deformed, diminished in size, elongated or shortened on one side, oval, heart-shaped, angular, etc., the protoplasm appears very

pale, poorly stained, or partly stained; in some cells the protoplasm is entirely absent; the nucleus and the nucleolus are missing from a number of cells. Besides, the accumulation of round cells in and around and between the ganglionic cells, as well as along the small blood vessels, is abundant. The picture reminds one of that in the Gasserian ganglion in Dog 4.

The sciatic nerve itself presented most pronounced changes; they were evident not only in peri-, epi- and endoneurium but also in the nerve bundles themselves. The connective tissue was in some sections extremely thickened and appeared very dense. The nerve bundles show very intense alterations: in some the degeneration was complete, in others almost complete and others more or less pronounced. Normal nerve bundles are very few in number: alongside ten degenerated ones only one is found intact, but when a normal nerve bundle is found, the nervi nervorum of the surrounding thickened perineurium are invariably in a state of degeneration.

SUMMARY OF THE FINDINGS

In the first series three dogs were kept alive nine days. In the infraorbital nerve peri- and endoneuritis with accumulation of small cells are seen around and in the vicinity of the smallest nerve bundles. The latter are intact, with the exception of an occasional nervus nervorum which is found degenerated. The Gasserian ganglion shows chromatolysis in some of the cells; the majority of the cells are intact.

The facial nerve at the periphery and in the medulla was found intact.

The sciatic nerve presented about the same changes as the infraorbital, viz., perineuritis with occasional degeneration of a nervus nervorum. The spinal ganglia showed slight chromatolysis.

In the second series three dogs were kept alive twenty-nine days.

The infraorbital nerve presented perineuritis with a very marked proliferation of round cells around each individual nerve-bundle; they are also seen in the adventitia of the arteries. The Gasserian ganglion presents marked chromatolysis and proliferation of cells of the capsule.

The peripheral facial nerve presented slight neuritis and evidences of regenerating connective tissue fibers. The nerve fibers were found intact. The course of the nerve in the medulla appeared to be normal.

The sciatic nerve showed very marked perineuritis with extensive degenerative changes in the nerve-bundles. In the spinal ganglia pronounced chromatolysis with proliferation of the capsular cells was observed.

The analysis of the findings brings forward this fact that they are strikingly different in the facial nerve from those in the infra-orbital and in the sciatic nerves. Otherwise speaking, the pathological changes vary in motor and sensory nerves when alcohol is injected into them. Moreover, it is evident that in infraorbital and sciatic nerves the alterations are almost identical in character and intensity, otherwise speaking, they are identical in sensory and mixed nerves. These peculiar features of motor and sensory nerves are manifest in both, the dogs of shorter and longer life.

If we consider the clinical phenomena observed during life following injections of alcohol, we observe that facial paralysis produced by injections of alcohol into the trunk of the facial nerve sooner or later disappears completely and the function of the nerve is eventually totally restored. In the present experiments we notice that in the dog that lived nine days no changes whatever were found in the peripheral facial nerve or in its nucleus. In the dog that recovered from facial palsy and that died at the end of twenty-nine days evidences of some perineuritis were present and young connective tissue fibers were seen; the latter are an indication of a regenerative process. As to the nerve bundles themselves, they were intact. Such findings correspond entirely to the clinical manifestations observed during life. They are a confirmation of the fact that a total recovery from an induced facial palsy is bound to follow. In my personal experience with facial spasm, injections of alcohol into the facial nerve were made two and three times on the same patient and two or three times facial palsy was induced. Complete recovery followed each time. It seems therefore that a motor nerve presents a great degree of resistance to alcohol: the nerve fibers themselves resist perfectly and the connective tissue alone is influenced; the induced temporary facial palsy is evidently due to the perineuritis; recovery follows because the nerve fibers remain uninfluenced.

When we turn our attention to a purely sensory nerve or to a mixed nerve the condition changes.

In the infraorbital and sciatic nerves of dogs that lived but nine days, alcohol produced promptly distinct changes: besides the

usual involvement of the connective tissue (peri- and endoneuritis) the *nervi nervorum* were found altered with the Marchi method. Chromatolysis though slight was seen in the Gasserian and spinal ganglia. In the cases of long standing (twenty-nine days) the same changes were present in the nerves and in the corresponding ganglia, but to a very marked degree. The clinical phenomena observed during life were: permanent sensory disturbances in the case of a purely sensory nerve and sensory, motor and trophic disturbances in the case of a mixed nerve. The rapidity with which material disturbances set up in the sensory and mixed nerves when they are in intimate contact with alcohol—also the progressive character of those disturbances—are all indications of a high susceptibility of such nerves to the effect of an irritating substance like alcohol. It is evident that alcohol produces a grave and irreparable damage to sensory filaments. While it relieves pain, it produces nevertheless an objective sensory disorder which remains permanent and leads eventually to trophic disturbances. In cases in which several injections are made into the same nerve, which frequently happens when the pain recurs, the destruction of the nerve is complete and permanent. In two of my cases I saw an eruption appear in the anesthetic area; in one case the patient happened to fall and injured the skin over the affected region; it took three months before the wound healed up.

Untoward results from injection of alcohol into mixed nerves have been observed by other writers. Schlösser, for example,² records a persistent peroneal paralysis following treatment of sciatica by alcoholic injections. Brissaud, Sicard and Tanon,³ from a series of experiments on dogs and rabbits, also from observations on man, conclude that paresis and trophic disturbances follow injections of alcohol into mixed nerves.

The experiments of Otto May⁴ on cats do not permit to draw definite conclusions, as the results obtained present great variability. In the animals 11 and 14 the injections produced no effect, in animal No. 12 transitory weakness, in Nos. 9, 10, 13, 15, 16 the results were severe and lasting. A close examination of these experiments reveals the fact that a different strength of alcohol was used in different animals. In experiments 9 and 14 alcohol

² Klin. Monatsblatt. f. Augenheilk., 1903, Bd. 41 (2), S. 244.

³ Revue Neurologique, 1906, p. 633.

⁴ British Med. Jour., 1912, Vol. 2, p. 471.

of the same strength was utilized and still for some reason the effects produced in these cases present a striking contrast. The author himself endeavors to explain the discrepancy by a difficulty of ensuring adequate penetration of the nerve by the alcohol. It is therefore evident that uniformity of procedure was neglected in his experiments and no definite inferences can be drawn from the results for practical purposes. Nevertheless the histological pictures of May's cases show the considerable damage done to mixed and sensory nerves when brought in contact with alcohol. There is no mention in his experiments of injections of alcohol into motor nerves.

Another observer, Finkelnburg,⁵ is the third author who, to my knowledge, studied the subject experimentally. He experimented only on mixed nerves, viz., sciatic. An almost complete degeneration of the nerve-bundles was found. Clinically a complete lasting paralysis of the corresponding muscles was observed. When the injections were made only into the neighborhood of the exposed nerve, motor weakness followed, lasting but a short time. Histologically after 21 days the outermost nerve-bundles presented considerable degenerative changes. Finkelnburg's experiments, like those of May, lack the rigorous uniformity indispensable for accurate deductions. The strength of alcohol varied from one animal to another.

In my experiments I endeavored to observe the strictest uniformity with regard to the exposures of the nerves, the injections of alcohol into the substance of the nerve, the strength of the alcohol, also to the number of drops injected, finally to the after care of the wounds. In view of these precautions, I was able to formulate the following conclusions:

1. There is a difference in histological changes when alcohol is injected into a motor, a sensory or a mixed nerve.
2. A motor nerve is considerably less influenced by the intimate contact with alcohol than a sensory or a mixed nerve.
3. Functional recovery follows in cases of injections into a motor nerve.
4. In cases of sensory or mixed nerves, persistent sensory, trophic and motor disturbances follow injections of alcohol.
5. In cases of motor nerves the gross nerve-bundles are not

⁵ Klin. Monatsblatt. f. Augenheilk., 1903, Bd. 41 (2).

affected. Only the perineural connective tissue suffers but then a condition of repair is evident in cases of long standing.

6. In cases of sensory or mixed nerves the histological changes are very conspicuous, not only after recent injections (nine days) but also long after the first injection (twenty-nine days). Not only the nerve-bundles themselves but also their respective ganglia (Gasserian and spinal), show distinct evidences of degenerative changes.

7. In therapeutic management of affections of nerves, the above difference in the susceptibility of motor and sensory nerves to the effect of alcohol must be borne in mind. Otherwise irreparable damage may be done to muscles and limbs supplied by those nerves.

Society Proceedings

AMERICAN NEUROLOGICAL ASSOCIATION

THIRTY-NINTH ANNUAL MEETING, HELD IN WASHINGTON, MAY 5, 6 AND 7,
1913

The President, DR. PEARCE BAILEY, in the Chair

(Continued from page 40)

Dr. Israel Strauss, New York City, read a paper entitled, "Some Important Features of the Cerebrospinal Fluid."

The speaker discussed lymphocytosis in lues of the nervous system in the absence of the Wassermann reaction, lymphocytosis in cases of tumor cerebri, lymphocytosis following hemorrhage into the subarachnoid space, polynuclear leucocytosis in sterile spinal fluid in cases of abscess of the brain or the adjacent parts and the xantho-chrome reaction.

Dr. S. P. Kramer, of Cincinnati, in attempted explanation of Dr. Strauss' case where he finds no signs of reaction in disease of the frontal lobe, called attention to the fact, generally forgotten, that there was no subarachnoid space over the cortex of the brain in front of the tentorium. There was a subarachnoid space in the sheaths of the cranial nerves at the base; but not over the rest of the brain. So that methylene blue, for instance, injected under the dura in front of the tentorium, does not reach the cisterna magna, nor does it reach the subdural cavity in the spine; and Dr. Kramer thought that this was the explanation. He had found the same thing, for instance, in fractures of the skull; the absence of blood cells in the spinal fluid where the fracture was in front of the tentorium and the presence where it was behind. He urged on the members the extension of the investigation of the cerebrospinal fluid along physiological lines. That is to say, in the various conditions in which we have an opportunity to examine the cerebrospinal fluid. Some time ago in a paper which some of the members might recall, Dr. Kramer noted that in cases of edema of the brain, in cases of delirium tremens, traumatic edema, edema accompanying coma, that the cerebrospinal fluid contained a very marked depressant, which caused a tremendous drop in the blood pressure in animals. Also that in one case of epilepsy there may have been a pressor reaction in the cerebrospinal fluid; but it occurred to the speaker that by physiological examination of the cerebrospinal fluid in a variety of diseases we may get some information in regard to it that may be of value. In all probability the cerebrospinal fluid was excreted by the choroid plexus, which Dr. Kramer had called choroid glands. There was no doubt that these glands do have a selective action. For instance, they would excrete bromide of soda, one would find bromide of soda in the cerebrospinal fluid after oral administration; whereas, the iodides will not be excreted. Dr. Kramer thought it had also been shown that formalin would be excreted by the choroid plexus. But there was no doubt that they do not

excrete all forms of poison which may be taken into the blood, but have a selective action; and those of the members so situated might add to our knowledge by a routine physiological examination of the cerebrospinal fluid.

Dr. Alfred Gordon, Philadelphia, asked Dr. Strauss whether from his extensive experience with the cerebrospinal fluid, he ever found spirochætes in it? With reference to meningitis Dr. Gordon had under his observation a case, on which Dr. Edward Martin operated, of a child, who at the age of five months developed epilepsy, confined to the right face and the right arm. The seat of the convulsions was determined by careful investigation among various members of the family, the convulsions were frequent, and strictly confined to the right side, face and arm. And another feature about this case was that the fontanelle closed at the age of six months. The child kept on having convulsions; finally was brought to the speaker, who put it in a hospital and kept it under his observation so closely as to frequently spend hours in the institution, and instructed everybody to observe the convulsions. Finally he succeeded in seeing them; and they were actually confined to the right side, as before stated. As to the diagnosis of said case, he made a lumbar puncture for diagnostic purposes; a thorough examination, microscopical, serological and chemical of the cerebrospinal fluid proved to be absolutely negative. What was the nature of the trouble? After keeping the child under observation for six weeks and treating him with antisyphilitic remedies, an operation was finally decided upon. Dr. Martin performed an osteoplastic operation. They found a circumscribed meningitis, a sac, covering the motor area, viz., the ascending frontal; the veins were distended. The area was left uncovered and, greatly to their surprise, the child kept on improving. The retraction of the head that the child presented before operation was excessive, also the retraction of the spine. The first couple of days after the operation the child kept on having convulsive seizures a little more violently and more frequently than before; and finally they subsided and disappeared; ten days later, a return of the same convulsions, again the lumbar puncture, and by this time, as soon as the speaker inserted the needle, the fluid came out like from a funnel, struck his face, and covered him. He collected from this puncture about 80 c.c. of the fluid. There was evidently a meningeal condition. Again an examination by two pathologists was made and the fluid was again found to be negative. The child had improved after this lumbar puncture; but soon a return of the convulsions; again a lumbar puncture; and again the speaker removed 80 c.c. under very high pressure; fluid was found again normal. It was evidently a case with a localized circumscribed meningitis of the brain, particularly in the motor area, giving symptoms of local pressure, or symptoms of brain tumor, but meningeal: the meningeal symptoms, after all, were predominating. The interesting part is, three successive examinations, by two serologists, both equally competent, gave absolutely negative results in every respect. The child is still living.

Dr. Smith Ely Jelliffe, New York City, asked Dr. Strauss if it had been his experience to come in contact with a lumbar puncture material somewhat of the following character: This material could be obtained only in small amounts found in the needle of the syringe, because it was thick and grumous, and more or less colloidal in its character. It was not stainable and contained no organized elements. It was obtained on three successive punctures, over two weeks intervals from needles in three dif-

ferent places. The patient presented a clinical picture which closely resembled paresis, but with negative Wassermann in the blood. Such a material the speaker has seen once in a patient with a Hodgkins disease about the posterior spinal canal. That was a somewhat similar grumous reddish colloidal substance; but the speaker desires further information. In the recent work of Rehm, Plaut and Schottmüller on the cerebrospinal fluid he found no mention of it, nor any reference to it in literature.

Dr. Israel Strauss, New York City, said in regard to Dr. Kramer's remarks, he did not wish to enter into a discussion of the question of the subarachnoid space, believing there was still considerable divergence of opinion as to what that space is, and its exact extent. The case of Dr. Gordon interested him and he asked him first whether or not he had a culture of the pus surrounding the brain, the original abscess, if he knew what the organism was. Because, if not, if it was a sterile pus Dr. Gordon would in that case have been dealing with a process not merely present in the hemisphere over the frontal lobe, but also would have been basilar, and he may have had, therefore, one of those chronic basilar meningitis cases which so frequently follow, say, the beginning of cerebrospinal meningitis; and the frequent quantity of clear fluid which Dr. Gordon obtained in that case would seem to the speaker to indicate an excessive degree of hydrocephalus; and investigation of basilar meningitis with internal hydrocephalus would generally show practically nothing in the cerebrospinal fluid. The speaker has not seen any fluids such as Dr. Jelliffe had described, and asked whether there was an autopsy in that case.

Dr. Smith Ely Jelliffe, New York City, replied no, that the patient was still alive.

Dr. Strauss stated that he could not explain that condition, never having met with such.

Dr. Jelliffe would like to know whether any of the members of the Association have ever met with a similar one.

Dr. Alfred Gordon, Philadelphia, answering the question of Dr. Strauss, replied that it was simply a circumscribed pouch; that there was no abscess, no discoloration of the fluid. It was a clear fluid, just like any fluid ordinarily removed from the spinal canal. Regarding the question as to the basilar meningitis, the child was still living and presented absolutely no symptoms referable to abscess of the brain, absolutely no involvement of the muscles of the eyes, or the eye grounds, which were entirely clear; and no other involvement of the cranial nerves. Dr. Gordon doubted very much the possibility of hydrocephalus. That was at one time in his mind, but he could not decide that question and so far as cultures were concerned, they made cultures also inoculations, but got negative results.

Dr. Strauss, adding a word with regard to Dr. Gordon's case, said that the presence of a fluid underneath the dura when the brain was exposed by the compression operation did not signify meningitis. All of us have probably seen this marked increase of fluid in cases that are exposed; so that the case of Dr. Gordon's therefore, even with all the negative findings, was one of an internal hydrocephalus, and not one of a true meningitis at all.

Dr. E. E. Southard, Boston, Mass., read a paper entitled, "A Further Study of Brain Anatomy in the Dementia Præcox Group."

This paper presented a continuation of work on the description and interpretation of anomalies and of general and focal atrophies and scler-

roses in the brains of dementia præcox subjects. Special stress was laid on focal atrophies in particular brain regions. Some encephalometric data in connection with a photographic study of 25 cases were presented.

Dr. Theodore Diller, Pittsburg, Pa., asked Dr. Southard in what percentage of cases he found such changes as he had described and what proportion of brains examined were normal, or approximately so.

Dr. Smith Ely Jelliffe, New York City, asked Dr. Southard whether, inasmuch as this series showed a high percentage of temporal changes in contrast with his former series of motor or of frontal area modifications, any psychological correlates or comparisons could be made with reference to the predominance of auditory phenomena.

Dr. Southard stated, as to percentages, that in his entire twenty-five there were only one or two of the sort queried after by Dr. Jelliffe wherein he found nothing in the gross. He did not wish to be understood as saying that these changes were differential, they were simply characteristic of dementia præcox. He would, therefore, make the percentage much higher than his 1910 percentage (86); the present group was much more carefully drawn. He, however, took every case of dementia præcox in which the brain was saved in the gross; and they were saved in the gross at random; and the speaker studied them all systematically, and was inclined to say that he would take any brain that one might send him, a case of dementia præcox, and find something in it of consequence, that has a relation either to agenesis or aplasia on the one hand, or in certain instances something in the histology of a case which may not be shown in the gross, but which may be shown microscopically; and the speaker would be willing to examine brains of cases from any of his fellow members of the Association of dementia præcox which they might wish to be examined. He thought there was much to be said in favor of dementia præcox as an organic disease, and much that would be explained, possibly, by these findings. Concerning Dr. Jelliffe's question, Dr. Southard would say that the temporal group seemed to be more paranoidal than catatonic, that the temporal results seemed to be more like frontal results than like the parietal; and in his paper there was considerable development of ideas upon that point; but he thought it was more important here to give the concrete evidence as to agenesis and aplasia than develop some of the more hypothetical considerations, which would have gone more properly in the psychopathological section. Dr. Southard thought it more worth while to trust to gross anomalies as to aplasia and as to actual cell loss and phagocytosis for those phenomena one can interpret; whereas, the lipid rearrangements, the Marchi stain and the Alzheimer stains give results which, though perfectly interpretable by good pathologists, particularly by good chemists, are not so differential as the effects of tissue destruction as registered in the gross. In fine, Dr. Southard felt that there was more evidence of aplasia than of agenesis in dementia præcox.

THE INTERPRETATION OF DIFFERENCES IN MAMMALIAN BRAIN WEIGHT IN TERMS OF THE STRUCTURAL ELEMENTS

By Henry H. Donaldson, M.D.

The speaker said that among the different species of mammals of increasing size and increasing brain weight, present information justified the general conclusion that the larger brains were composed of the greater

number of structural elements. Within a given species, however, the question arose whether the number of elements in the large brain was really greater than in the small brain, or whether we were to regard the large brain as composed of the same number of structural elements as the small brain—the size of the elements accounting for the difference in gross size. In man we found differences of 10 to 20 per cent. in the brain weights among the two sexes and at different ages after maturity. There was about the same range of difference in brain weight in the rat—the brain of the very large, wild Norway being about 20 per cent. heavier than that of the corresponding domesticated albino. Using the rat as the species for study, the following relations have been found: The brain weight was alike in the two forms (wild Norway and albino) during the first three weeks of life. The relative weights of the divisions of the brain are alike in the two forms, despite the difference in absolute weight. The percentages of water in the several subdivisions are similar in both forms. The observed number of medullated fibers in one peripheral nerve (nervus peroneus) is the same in both forms. The size of the cell bodies in several localities was found to be greater in the Norway than the albino. Finally, as the weight of the brain was closely correlated with the body size, it was possible to produce from the same litter by modifications of diet animals with brains of different absolute sizes. These brains presumably contain the same number of neurones. All this points to the general conclusion that in the case of the rat the differences in the size of the brain are due to differences in the size of the elements. If we apply these tests to man, we find that so far as the observations exist the results are similar. It was concluded, therefore, that within a given species of mammals—illustrated by man and the rat—the difference in the absolute weight of the brain either within the same sex, or when the two sexes are compared, was mainly due to differences in the size of the constituent elements.

Dr. E. E. Southard, Boston, said that as to the question of agenesis versus aplasia connected with the dementia præcox brains which he had been studying, he found the various persons with whom he talked felt that, for instance, in a small brain in dementia præcox patients might well be subject to agenesis. If these conclusions of Dr. Donaldson be correct, it might be more probable that the small brain of dementia præcox, like the small heart or small aorta, should be an instance of aplasia or hypoplasia, rather than agenesis. Agnesia should mean a condition in which certain elements are lacking; while aplasia should mean an alteration in the negative direction, in the size or other qualities of the cells. One can speak of hyperplasia, of aplasia, of hypoplasia; there are gradations in the plasticity of the elements. There are no gradations in respect to agnesia: it is either genesis or agnesia. He thinks, therefore, we should be careful how we speak of the brains, even, of morons, imbeciles, or idiots, as agnesic. This minor point of nomenclature would be found, in subsequent years, to have a tremendous bearing upon the interpretation of these conditions. If we get used to employing the word agnesia, we will come to think that dementia præcox means an absence of certain elements; whereas, it may not at all mean such. In fact, the evidence would seem to the speaker to be rather that the dementia præcox brains are in possession, perhaps, of their normal quantity of elements. Many counts would have to be made to make this point good.

Dr. Henry H. Donaldson, Philadelphia, said, apropos of Dr. Southard's

remarks, that with Dr. Hickson he had recently been over a short series of brains belonging to deficient and defective children from the Vineland, New Jersey, institution.

On separating these into their larger divisions, cerebral hemispheres, cerebellum and stem, and taking the weights of the divisions, he was rather surprised to find that the relative weights were close to those of the normal brains, in most cases.

His own interpretation of this fact is that it favors the view that the elements composing these brains are small in size, rather than deficient in number.

Dr. L. Pierce Clark and Dr. Edward A. Sharp, New York City, read a paper entitled, "The Rôle which Heredity Plays in Inducing Epilepsy in Children Suffering from Infantile Cerebral Palsy." (See this JOURNAL, page 633.)

Dr. E. E. Southard, Boston, stated that at the Psychopathic Hospital, connected with the outpatient department, the chief of the department, Dr. Lucas, had been working upon heredity in epilepsy; and an interesting confirmation of Dr. Clark's conclusions was in process of being obtained. The worker had spent some eight months upon the heredity in these cases, and had unfortunately been unable to establish what the speaker and his associates thought she might establish, namely, the difference in the heredity features in the organic and inorganic cases; and the speaker would judge that an intensive work upon this small number of cases would entirely confirm Dr. Clark's results. The material was derived in an interesting way, of which more anon. The records of the Children's Hospital in Boston, and of hospitals dealing with children, were searched for the period of some ten years back, for cases that had recovered from nervous disease; and these cases were hunted up by the social workers and their parents urged to bring them to the clinic for the various tests and with this material some work is being done. A side issue, Dr. Southard thinks, will be to confirm these views of Dr. Clark.

THE FEEBLEMINDED IN MASSACHUSETTS OUTSIDE OF INSTITUTIONS

By William Noyes, M.D.

The speaker stated that this inquiry was undertaken under the direction of the State Board of Insanity, which had the duty of recommending to the Legislature the provision that should be made each year for the institutional care of the feebleminded. Heretofore no data have existed that would give an adequate idea of the extent of the provision needed because of the varying estimates of the number requiring institutional care. All the available sources of information were utilized and the data received were entered on cards, one for each individual. The cards were finally brought together in alphabetical order to prevent duplication, showing a listing of 5,007 individuals, 2,640 males and 2,367 females, who were considered by one or more persons as being feebleminded. These totals do not include returns from the schools of the five large cities of Boston, Cambridge, Lowell, Fall River, and Salem. It is estimated that there are at least 628 institution cases in the schools of Boston. It is easily seen, therefore, that the institution cases in the schools of the four other cities would increase the totals in a very marked degree. On the other hand, it

must not be assumed that the 5,007 individuals listed in the census are by any means all institution cases. Defective delinquents have been rejected when known to be such. For the purpose of comparison with the State census of 1905 a more intensive study of a given section, including 21 towns, was made; 105 feeble-minded individuals were found, while the State census gave but 37, a very marked difference. If the same proportion held throughout the State, the total number in the community would be 7,861. A committee has prepared tables estimating the cost to the State of three feeble-minded families—the W— family and two branches of the B— family. The tables are made on the estimated cost of caring for a feeble-minded child by the State Board of Charity at \$180 a year until the average age of 33. The totals of these feeble-minded children are as follows: 9 members of the W— family will cost the State \$30,705; 7 members of the B—I family will cost the State \$21,470; 3 members of the B—II family will cost the State \$12,600.

Dr. L. Pierce Clark, New York City, congratulated Dr. Noyes on this excellent and timely piece of work. He was particularly interested in the relatively small cost of segregation of mental defectives as compared with the let-alone policy which latter plan is so popularly held by the lay public to be much the cheaper. Dr. Noyes' conclusions ought to be widely disseminated to refute the latter view.

He thought we ought to make every effort to segregate the moron, the highest type of the feeble-minded, in addition to those considered by Dr. Noyes, as the former were the class essentially dangerous to the future welfare of the community. Many conscientious neurologists and alienists still fail to recognize this type. If necessary a special propaganda should be inaugurated, such as that outlined by the modern eugenis, Goddard and Davenport. The moron plays a very important rôle in the immigration, army and navy, and insanity problems to-day and should be carefully studied. At the same time he was not prepared to rely upon literary test for detection of the moron, otherwise many of the common day-laboring class would be too greatly included with paupers and petty criminals. In New York City the special classes in the schools were serving in many instances for the very lowest types of mental defectives and not for the moron group, the ideal one for such educational treatment. The ungraded classes served well for the feeble-minded group until proper segregation in the colonies could be provided.

Dr. Philip Zenner, Cincinnati, requested Dr. Noyes to tell something of the methods of segregation.

Dr. Noyes replied they were merely institutions; that segregation with them meant, merely, committing the subjects to the two state schools, those at Waverly and Wrentham. One matter of statistics that might have been mentioned was this: that of 87 women under the charge of the state board of adult poor, 68 are known to have had children, 92 illegitimate and 17 legitimate, making a total of 109 children born by 68 feeble-minded and borderline mothers. That is merely a little detail that comes in the reports. Most of the replies come from physicians, charity workers and overseers of the poor.

Dr. Charles L. Dana, New York City, inquired whether it included the driveling idiots.

Dr. Noyes replied yes.

Dr. Dana asked whether it included the moron, to a certain degree.

Dr. Noyes said that he and his associates definitely excluded the bor-

derline cases, the morons, when dealing with people that they felt would appreciate the distinction. That is, with hospitals, the hospital records and charity workers, they definitely excluded them but where they got into the country and interviewed or had reports from various individuals in the country towns, of course, they could not rely so much on that, but the feeling in the country districts was such a friendly one towards the neighbors there is a probability that nobody would report a case, unless it was pretty well marked, but so far as definite data are concerned, they have these 7,000 names, of 5,000 of which they have a short history, and, of course, those names they expect will be cropping up for years to come in the records of the various charitable institutions of Massachusetts. That, it seemed to Dr. Noyes, was probably what all states, having to deal with this problem, would have to come to, that there should be a definite census made of them and of those the profession would look on as more dangerous, and that the state shall assume charge of all these and say they cannot have their liberty.

Dr. Dana asked whether Massachusetts had about 4,000,000 population.

Dr. Noyes replied something over 3,000,000.

Dr. Dana said that the latest estimate of New York City had something about 5,000 of this class and so it seemed to him the estimates mentioned by Dr. Noyes rather confirmed the estimates made in New York. Dr. Noyes said that he was surprised and gratified when that inquiry into these special towns had come out, that it practically agreed with what was generally put out, about 1 in 500. Regarding the taking of that particular inquiry, Dr. Noyes did it himself in the summer time, interviewing by telephone and verbally all the physicians and the superintendent and supervisors of the poor, and everybody he could get in touch with, so that after he got through he was a little surprised that Dr. Southard felt that he had unconsciously struck another little nidus of feeble-mindedness in that particular section, something like the section in the western part of the state, Sheffield. Dr. Southard has a field worker at present in this particular group of towns there, and when the inquiry is ended his results will show whether that is a particularly fertile field for feeble-mindedness. It did not so strike Dr. Noyes as he went round at that time.

LESIONS OF THE HYPOPHYSIS FROM THE VIEWPOINT OF THE SURGEON

By Charles H. Frazier, M.D.

Four cases of hypophyseal disease were reported in which the hypophysis had been approached by his transfrontal intracranial method. There were no operative fatalities. The speaker called attention to the advantages of this over the transphenoidal method, as indicated by his own experience and from a review of sixty-five operations by various surgeons who had used the extracranial approach. He called attention to the difficulty in determining before the operation what the nature or size of the lesion was. The same clinical picture would be present in all sorts of hypophyseal lesions, including hyperplasia, benign and malignant growths. Any one of these lesions might lead to evidences of hypo- or hyperpituitarism or to neither. The only evidence of pituitary disorder in many cases was revealed in the visual disturbances and the signs of intracranial tension without the least suggestion of the perversion of the metabolic

processes. The confusion that had arisen in the mind of the experimentalist as to how vital the hypophysis was for the maintenance of life was called attention to, and Dr. Frazier was inclined to accept the opinion of those who had found in animals that complete removal was not incompatible with life. He referred to the further confusion in the minds of the pathologists as to the classification of pituitary tumors, and showed how comparatively benignant was the life history of certain malignant lesions, so that in the presence of malignancy the beneficial effects of operation would extend over a number of years. The author reviewed the indications for surgical therapy, the beneficial results of which were seen in the majority of instances in the relief of the visual disturbances, headache, psychic disorders, and to a less extent of the symptoms of acromegaly and dystrophy. He found it of advantage in his own cases to combine glandular feeding with surgical intervention and did not believe that operation ever should be resorted to, except in danger of impending blindness, until glandular feeding had been given a trial. He was quite fully convinced that in the future the transfrontal method of approach would be adopted by the general surgeon, and, if the transphenoidal method were used at all, it would be practised only by the specialist trained in the technique of intranasal procedure. Palliative procedures, such as temporal or sella decompression, were only of questionable value and only transitory in their influence upon the symptoms.

Dr. Kramer thought from what the audience had heard that the conclusion would be justified that surgical operation for the relief of pituitary tumor should be based on a desire to relieve the neighborhood symptoms. The most important of these are visual disturbances, and the speaker wished to state a case which was almost unique. In 1911 there was brought to his service at the Cincinnati Hospital a patient who, in 1873, had become completely blind with optic atrophy. This, of course, was before the days of much pituitary knowledge. In 1911 she appeared with a pituitary syndrome, adiposity, and so on. She died from inanition in December, 1911. The speaker had no autopsy. Here was a patient who lived with a pituitary tumor, blind, from 1873 until 1911. The desire on the part of the surgeon to develop a technique which shall be comparatively free from danger, has been the impetus which has developed the transphenoidal operation. But if the operation cannot offer actual relief, or retard the development of neighborhood symptoms, it makes no difference how safe the operation might be, it ought not to be performed. Whereas, if the intracranial operation would do this to a more considerable extent, as is *a priori* reasonable (because, as Dr. Frazier has pointed out, the tumor most frequently grows upward), that operation would be the one that should be developed. The speaker had seen at home another case with pituitary tumor which was operated upon by Dr. Hirsch, of Vienna, by the intranasal route, later in Baltimore by a temporal decompression, and the optic atrophy had been uninterrupted and had now gone on to complete blindness.

Dr. Alfred Reginald Allen, Philadelphia, said Dr. Frazier had in the past year sent him four specimens, parts of the pituitary, and the point of interest was the discrepancies in opinion of various men as to the histopathological diagnosis. Whereas, the profession had a very adequate idea, from the old histological and histopathological aspect, of chronic interstitial nephritis, yet when we come to the cytological study of the pituitary in disease our knowledge is very little. The speaker believes

that one reason for this is that the surgeon will dig out a piece in the operating room and set it aside until after the operation is over. It will then in a dried up condition be dumped into 10 per cent. formalin and after a while reach the pathologist's hands. If surgeons will make it a point to have several fixing fluids there, preferably Zenker's, Planese's and absolute alcohol, and divide the tissue among those three, they will shortly come before you knowing a great deal more about the histopathology of the neoplasms of the pituitary body.

Dr. L. Pierce Clark, New York City, asked Dr. Frazier what had been done in regard to a definite determination, by chemical means, of the hyperfunctioning on the part of the glands, and a hypofunctioning, or whether the polyglandular extracts had been of value, or whether Abderhalden's work upon the split products had given a more definite understanding of the metabolism in these cases. Possibly the author, in consulting the literature, had had occasion to form some idea in reference to these questions.

Dr. Herman H. Hoppe, Cincinnati, adding a word of commendation to Dr. Frazier's new technique of the dressings, spoke of having in his possession in Cincinnati a brain tumor that was obtained before the days of the X-ray, and also before the study of hypophyses. It was a hard fibroma, that was probably two inches in diameter. It never could have been removed by the transnasal route. To-day this case would have been diagnosed at once, and could have been removed very easily by the transfrontal route, and this man's life would have been saved, providing the surgical technique had been successful.

Dr. Charles H. Frazier, Philadelphia, expressed doubt as to his ability to answer all the questions as to the chemistry of glandular feeding, but was of the impression that there had not been any striking difference between the effects of the glands as a whole or its component parts. In the preparation of his paper it had been his aim to take up the question of glandular therapy, but he found it would take him too far afield, so that he confined his remarks to a discussion of the pathological peculiarities of pituitary disease as they bore upon the question of surgical intervention. He tried to be conservative, at least in his estimate of the usefulness and the limitations of surgical therapy. He wished to emphasize the following points: (1) that so-called malignant lesions of the pituitary body run a very benign course; (2) that when tumors assume large proportions they extend upwards beyond the confines of the sella turcica, so that they are more readily approached from above; (3) that in most of the operations performed by the endonasal method there had been a very incomplete removal of what in many instances was a very large tumor, and, lastly, that, in the hands of most surgeons the intracranial method will prove to be the safer of the two. Comparing the author's transfrontal with the various transphenoidal methods, the speaker called attention to the fact that the distance from the upper lip to the sella turcica—the route followed by the transphenoidal method—is greater than the distance from the supraorbital ridge to the sella turcica, as in the transfrontal method. In the latter the incisions are so placed that only one is conspicuous, and so that there is really no objection to this operation from the cosmetic point of view. By puncturing the dura in the early stage of the operation, the escape of cerebrospinal fluid enables the operator to elevate the frontal lobe sufficiently to afford adequate exposure of the region of the hypophysis. By displacing the orbital contents downwards with the patient's head in the

Rose position and using artificial illumination, a very satisfactory view is obtained of the depths of the wound. When the apex of the orbit has been reached, the operator is within striking distance of the pituitary body and it remains only to make a transverse incision in the dura about a quarter of an inch above the base of the skull to expose the contents of the sella turcica. The operation is not a difficult or complicated one, and in most instances in the speaker's experience was more simple than the exposure and removal of the Gasserian ganglion. The speaker did not stand alone in his preference for the transfrontal over the transphenoidal method of approach, as the former operation had been advocated by McArthur and by Elsberg. The latter, after his initial experience, was surprised at the comparative simplicity of the procedure and at the facility with which he reached and removed a large pituitary growth. The whole question of surgical therapy as applied to pituitary lesions is still in its developmental stage and at this juncture one could not speak too dogmatically, but the speaker still felt that in those cases in which surgical intervention seemed justifiable, the transfrontal approach would prove to be the operation of choice.

Dr. Theodore H. Kellogg's paper, entitled, "Mental Morbidities of the Conjugal State," was read by title, in the absence of the author.

The paper by Dr. Menas S. Gregory and Dr. Morris J. Karpas, New York City, "Chronic Periostitis and Ostitis, Probably Syphilitic, of the Skull, Producing a Definite Neurologic Syndrome, That of Cerebellar Pontine Tumor. A Complete Report of a Case with Post-Mortem Findings," in their absence, was read by title.

"The Neurologist and the Public," by Dr. Charles L. Dana, New York City, was read by title.

The vice-president, Dr. Zenner, introduced Dr. Reynolds, of the Gynecological Society, who wished for a moment to bring a matter before this Association and other sections of the Congress, and asked the consent of those present thereto. This was agreed to.

Dr. Reynolds stated that the American Gynecological Society last year appointed a committee to investigate the best means of disseminating knowledge of the importance of the early diagnosis of malignant disease in cancer, and also statistical investigation of the conditions under which malignant diseases occur. That the committee, in the course of its work, interested a large number of laymen and laywomen in New York, and they inaugurated a movement for the formation of a national society, largely of lay people under the guidance of the profession, for the demonstration of the useful information and for the collection of statistical information. They have guaranteed already the sum of \$5,000 for the first year's expenses, but with the passage of the following resolution:

WHEREAS, At an informal meeting of surgeons and laymen, called at the instigation of the members of the American Gynecological Society residing in New York City to discuss the formation of a society to deal with the cancer problem, the chairman was directed to appoint a committee on organization and we were therefore appointed said committee, and

WHEREAS, We believe that without the approval and support of the active medical profession of the entire country such an organization could not succeed, and we therefore wish to employ the help of the several branches of the Congress of American Physicians and Surgeons,

Be it Resolved, That we request the American Gynecological Society to present the matter to each of the branches of the said Congress inter-

ested in the subject and ask each of said branches to appoint a committee of two or more members to coöperate with us in the formation of a national organization for educational and publicity work in the recognition and treatment of cancer and that we meet with such committees as soon as may be after the meeting of the said Congress to be held during this current week.

(Signed) J. E. PARSONS
D. EVERETT MACY

and by seven physicians of New York City in good standing.

Dr. Reynolds understands that a committee was appointed by other branches, which committees need not necessarily be expected to do a large amount of detail work, but will lend their names and the authority of the society which they represent to these public-spirited laymen who are subscribing money and are ready to take up statistical investigation of cancer and the publication of the importance of early diagnosis to the laity. Dr. Reynolds and his fellow members were appointed a committee to express to the American Neurological Association the hope that it would be willing to pass such a resolution. (On motion, resolution adopted.)

Dr. Reynolds thanked the Association and asked the chairman to appoint a committee of two and to send the names thereof to the secretary of the American Gynecological Association.

The chairman asked how said committee should be appointed. Dr. Harold B. Moyer, Chicago, Ill., answered by the chair. Thereupon Dr. Zenner appointed Dr. Moyer, when he was interrupted by the latter rising to state it might be wise to delay appointment, as it was evident that the headquarters of the Association would be in the east and it would be far better in his judgment if men were selected from the east that could readily meet with the other members of this committee, averring that the geographical situation ought to govern. Dr. Moyer further suggested the appointment of Dr. Harvey Cushing, of Boston, and Dr. B. Sachs, of New York City, as they were very much interested in cancers generally, whereupon the chairman appointed Drs. Cushing and Sachs.

Dr. Kramer presented a paper entitled, "Recent Contributions to our Knowledge of the Circulation in the Central Canal."

Dr. Smith Ely Jelliffe, New York City, asked how much trikresol is present in 2 c.c. of a 2 per cent. serum.

Dr. Kramer said that 2 c.c. and $\frac{1}{2}$ per cent. of trikresol, all in the internes employed in the New York Board of Health say in their circular that they use $\frac{1}{2}$ per cent. of trikresol, that he wrote to the New York Board of Health perhaps two weeks before his publication, and got no answer, and after the publication and after the experiments were done, he got a letter reciting that they used $\frac{1}{4}$ of 1 per cent., but he very much doubted whether there would be much difference in the toxicology of $\frac{1}{4}$ as against $\frac{1}{2}$.

Dr. Jelliffe remarked that was a very, very small amount.

Dr. Morton Prince, Boston, asked whether the author had considered another possible interpretation of this phenomenon, namely, anaphylactic shock. Yesterday a series of very interesting papers was read on the subject of these deaths in the meeting of the Association of American Physicians. Dr. Park, of New York, called attention to the deaths following the injection of serum, and his calculation was that about one in every 100,000 died with symptoms of the kind described by the reader. Death occurred in from ten to fifteen minutes following the injection.

There was the same fall of blood pressure, and, apparently, the other symptoms were similar. Of course, in the cases reported by Dr. Park the serum was given for the most part intravenously or subcutaneously, but he also included cases where it was given intraspinally. The interpretation of those cases was that death was due to anaphylactic shock. Here is another possible interpretation, Dr. Prince thought, which had to be considered, and he asked information on this point from Dr. Kramer.

Dr. William H. Welch, Baltimore, urged caution as to creating the impression that there was such serious danger in the use of the antimeningococcus serum as to constitute or create in the mind, at least of the public, that the use of that remedy was harmful. The same thing came up, of course, with the discovery of the antiprophyllactic serum and the use of the antidiphtheritic serum, and in the interest of the preventive value of the serum they were very much concerned as to the impression that might be made upon the public mind by this discovery. Undoubtedly it has led to caution, it has led to careful weighing of a possible danger, it has led to a reluctance to use the serum needlessly, hesitation to use it where it is not necessary. Then it does not seem to Dr. Welch that we know enough about these cases of sudden death after the injection of this antimeningococcus serum. The speaker misses, in Dr. Kramer's statement, as he did in reading his very interesting and valuable paper, any very careful study of all the conditions surrounding the death in those cases. Every individual case would have to be very carefully studied as to a possible explanation. He asked Dr. Kramer whether he, in any case of this sudden death, had an opportunity of examining the cord to find whether his hypothesis was supported, whether, indeed, there was an open canal in a case of sudden death following the injection of the serum into this cerebrospinal canal. That would be the essential link, of course, in his chain of proof. Given a case of sudden death, is his hypothesis sustained by the discovery, in that case, of an open canal? Dr. Welch said in his experience it was a very exceptional occurrence to find a continuously open canal. He recalls very few instances, except in nephritis and very young children, of an open canal for any distance in the cord, and it would take a very prolonged and painstaking study with serial sections before Dr. Kramer would be justified, in any case of such death, in adopting the explanation that it was due to the open canal. Then, too, Dr. Welch was afraid that Dr. Kramer did give a somewhat exaggerated impression, unintentionally, by his not having any real statistical basis but culling from reports and impressions of nurses, and upon his own instances of sudden death. Dr. Flexner was not here, with his thousand or more cases, to explain as to what the danger really is. It was only upon the basis of large numbers that any conclusion could be drawn as to the extent of the danger, but it ought to stimulate investigation and Dr. Welch simply would urge a word of caution against spreading erroneous impressions which might lead to hesitation in the use of this extremely valuable remedy.

Dr. D. J. McCarthy, Philadelphia, spoke of the possible effect of pathological conditions on the central canal. In some cases of cerebral tumor this occurs. In one case he remembered where, in a tumor affecting the 3d ventricle, there was an extension into the 4th ventricle and this was associated with a hydromyelia in the mid-dorsal area. Such a process might indicate a possible factor if the opening of the central canal into the subarachnoidal space might be sufficiently large where one had fluid injected under pressure to produce a pathological, so to speak, opening of

the central canal. A study of sections of this kind in these tumor cases would seem to indicate where the canal is apparently closed there is a possible opening under pressure.

Dr. Kramer said that anaphylaxis was constructed as the picture of death by sudden respiratory failure. Of course, there can be no anaphylaxis in experiments with trikresol. Dr. Kramer was very glad, indeed, to hear Dr. Welch's remarks, first, in regard to statistics, and thinks Dr. Palmer's report proved to be a very valuable statistical report. He reported the results of treatment in 230 cases in Kansas City and he listed ten cases of respiratory paralysis. He had no explanation for them, it was only after Dr. Kramer called his attention to it that in a later letter Dr. Palmer described the deaths and gave the time of the lapse between the injection and death. Unfortunately, for the statistical part of our knowledge, these catastrophies have been more or less ascribed to technique, and it is barely possible that they have not been reported as frequently as they have occurred. In so far as regards the possible explanation of this opening of the canal as an artefact due to pressure (if that was what was intended), Dr. Kramer very much doubted whether by an injection of a few drops of ink into the cord with a hypodermic syringe there would be very much pressure transmitted through two or three inches of cord, sufficient to produce an artefact, he also thought that the appearance there was one that did not look very much like an artefact. With respect to Dr. Welch's question as to the definite establishment of a lower opening of the central canal in a given case, Dr. Kramer would say that that was the case, that in one of these cases a lower opening of the canal was demonstrated by this method.

Dr. William H. Welch asked how about the canal all the way.

Dr. Kramer replied that there was one, that in fact all of these cords that he examined had had an open canal all the way up. And that, indeed, was almost the universal opinion of anatomists, that that exists in children. Stilling in his original paper had maintained that it was always open in adults, but the artefact was on the other shoe, other men who did not find the opening did not do so because of faulty methods of fixation, etc. Now, with regard to the sociological aspects of this matter, that might be a broad term to use, the question of alarm. Dr. Kramer thinks that alarm, if such exists, will best be allayed by a report of this kind, that the individual had reported an explanation, pharmacological explanation, or toxicological explanation, for these deaths, and that these experiments must be repeated and the truth or otherwise thereof established. The speaker did not think that questions of this kind would be settled by polemic or by arguments, or by *reductio ab absurdum*. They will be settled by a repetition of these experiments, either along these lines or better experimental lines.

Translations

MYTH OF THE BIRTH OF THE HERO

By OTTO RANK, M.D.,

OF VIENNA

TRANSLATED BY DRs. F. ROBBINS AND SMITH ELY JELLIFFE

(Continued from p. 56)

This complicated myth with its promiscuous array of personages is thus simplified and reduced to three actors, namely the hero and his parents. Entirely similar conditions prevail in regard to the "cast" of many other myths. For example, the duplication may concern the daughter, as in the Moses myth, in which the princess mother (in order to establish the identity of the two families)⁸⁸ appears among the poor people as the daughter Miriam, who is merely a split of the mother, the latter appearing divided into the princess and the poor woman. In case the duplication concerns the father, his doubles appear as a rule in the part of relatives, more particularly as his brothers, as for example in the Hamlet saga, in distinction from the foreign personages created by the analysis. In a similar way, the grandfather, who is taking the place of the father, may also appear complemented by a brother, who is the hero's grand uncle, and as such his opponent, as in the myths of Romulus, Perseus and others. Other duplications, in apparently complicated mythical structures, as for example in Kaikhosrav, Feridun, and others, are easily recognized when envisaged from this angle.

The duplication of the fathers, or the grandfathers, respectively, by a brother may be continued in the next generation, and concern the hero himself, thus leading to the *brother myths*,

⁸⁸ This identification of the families is carried through to the minutest detail in certain myths, as for example in the *Ædipus* myth, where one royal couple is offset by another, and where even the herdsman who receives the infant for exposure has his exact counterpart in the herdsman to whom he entrusts the rescue of the boy.

which can only be hinted at in connection with the present theme. The prototypes of the boy, who in the Kyros saga vanish into thin air after they have served their purpose, namely the exaltation of the hero's descent, if they were to assume a vitality of their own, would come to confront the hero as competitors with equal rights, namely as his brothers. The original sequence is probably better preserved through the interpretation of the hero's strange doubles as shadowy brothers, who like the twin brother, must die for the hero's sake. Not only the father, who is in the way of the maturing son, but also the interfering competitor, or the brother, are removed, in a naïve realization of the childish fantasies, for the simple reason that the hero does not want a family.

The complication of the hero myth with other myth cycles include, besides the myth of the hostile brothers, which has already been disposed of, also the actual incest myth, such as forms the nucleus of the Œdipus myth. The mother, and her relation to the hero, appear relegated to the background in the myth of the birth of the hero. But there is another conspicuous motive, meaning that the mother is so often represented by an animal. This motive of the helpful animals⁸⁹ belongs in part to a series of foreign elements, the explanation of which would far exceed the scope of this essay.⁹⁰

The animal motive may be fitted into the sequence of our interpretation, on the basis of the following reflections. In a similar way as the projection on to the father justifies the hostile attitude on the part of the son, so the lowering of the mother into an animal is likewise meant to vindicate the ingratitude of the son, who denies her. In a similar way as the detachment of the persecuting king from the father, the exclusive rôle of a wet nurse, allotted to the mother, in this substitution by an animal, goes back to the separation of the mother into the parts of the child bearer and the suckler. This cleavage is again subservient

⁸⁹ Compare Gubernatis, *Zoological Mythology*, London, 1872 (In German by Hartmann: *Die Tiere in der indogermanischen Mythologie*. Leipzig, 1874). Concerning the significance of animals in exposure myths, see also the contributions by Bauer (p. 574 et seq.), Goldziher (p. 274) and Liebrecht: *Zur Volkskunde (Romulus und die Welfen)* (Folk Lore, Romulus and the Whelps), Heilbronn, 1879.

⁹⁰ Compare Freud's article on *The Infantile Recurrence of Totemism* (Imago, Vol. II, 1913). Concerning the totemistic foundation of the Roman she-wolf, compare Jones' *Nightmare (Alptraum)*, p. 59 et seq. The woodpecker of the Romulus saga was discussed by Jung (*loc. cit.*, p. 382 et seq.).

to the exalting tendency, in so far as the child bearing part is reserved for the high born mother, whereas the lowly woman, who cannot be eradicated from the early history, must content herself with the function of a nurse. Animals are especially appropriate substitutes, because the sexual processes are here plainly evident also to the child, while the concealment of these processes is presumably the root of the childish revolt against the parents. The exposure in the box and in the water asexualizes the birth process, as it were, in a childlike fashion; the children are fished out of the water by the stork,⁹¹ who takes them to the parents in a basket. The animal fable improves upon this idea, by emphasizing the similarity between human birth and animal birth.

This introduction of the motive may possibly be interpreted from the parodistic point of view, if we assume that the child accepts the story of the stork from the parents, feigning ignorance, but adding superciliously: If an animal has brought me, it may also have nursed me.⁹²

When all is said and done, however, and when the cleavage is followed back, this separation of the child bearer from the suckler—which really endeavors to remove the bodily mother entirely, by means of her substitution through an animal or a strange nurse—does not express anything beyond the fact: The woman who has suckled me is my mother. This statement is

⁹¹ The stork is known also in mythology as the bringer of children. Siecke (*Liebesgesch. d. Himmels*, p. 26) points out the swan as the player of this part in certain regions and countries. The rescue and further protection of the hero by a bird is not uncommon; compare Gilgames, Za., Kyknos, who is exposed by his mother near the sea and is nourished by a swan, while his son Tennes floats in a chest upon the water. The interpretation of the leading motive of the Lohengrin saga also enters into present consideration. Its most important motives belong to this mythical cycle: Lohengrin floats in a skiff upon the water, and is brought ashore by a swan. No one may ask whence he has come: the sexual mystery of the origin of man must not be revealed but it is replaced by the suggestion of the stork fable: the children are fished from the water by the swan and are taken to the parents in a box. Corresponding to the prohibition of all enquiries in the Lohengrin saga, we find in other myths (for example, the Oedipus myth), a *command to investigate*, or a riddle which must be solved. For the psychological significance of the stork fable, compare Freud, *Infantile Sexual Theories*. Concerning the Hero Myth, compare the author's extensive contribution to the elaboration of the motives and the interpretation of the Lohengrin saga (Heft 13 of this collection, Vienna and Leipzig, 1911).

⁹² Compare Freud: *Analysis of the Phobia of a five year old Boy*. *Jahrbuch f. psychoanalyt. u. psychopath. Forschungen*, Vol. I, 1909.

found directly symbolized in the Moses legend, the retrogressive character of which we have already studied; for precisely the woman who is his own mother is chosen to be his nurse [similarly also in the myth of Herakles, and in the Egyptian-Phenician Osiris-Adonis myth, where Osiris, encased in a chest, floats down the river to Phenicia, and is finally found under the name Adonis, by Isis, who is installed by Queen Astarte as the nurse of her own son].⁹³

Only a brief reference can here be made to other motives which seem to be more loosely related to the entire myth. Such motives include that of playing the fool, which is suggested in animal fables as the universal childish attitude towards the grown ups; furthermore, the physical defects of certain heroes [Zal, Œdipus, Hephaistos], which are perhaps meant to serve for the vindication of individual imperfections, in such a way that the reproaches of the father for possible defects or shortcomings are incorporated in the myth, with the appropriate accentuation, the hero being endowed with the same weakness which burdens the self-respect of the individual.

This explanation of the psychological significance of the myth of the birth of the hero would not be complete without emphasizing its relations to certain mental diseases. Also readers without psychiatric training—or these perhaps more than any others, must have been struck with these relations. As a matter of fact, the hero myths are equivalent in many essential features to the delusional ideas of certain psychotic individuals, who suffer from delusions of persecution and grandeur,—the so called paranoiacs. Their system of delusions is constructed very much like the hero myth, and therefore indicates the same psychogenic motives as the neurotic family romance, which is analysable, whereas the system of delusions is inaccessible even for psychoanalytical approaches. For example, the paranoiac is apt to claim that the people whose name he bears are not his real parents, but that he is actually the son of a princely personage; he was to be removed for some mysterious reason, and was therefore surrendered to his

⁹³ Usener (*Stoff des griechischen Epos*, S. 53—Subject Matter of Greek Epics, p. 53) says that the controversy between the earlier and the later Greek sagas concerning the mother of a divinity is usually reconciled by the formula that the mother of the general Greek saga is recognized as such while the mother of the local tradition is lowered to the rank of a nurse. There may therefore be unhesitatingly regarded as the mother, not merely the nurse of the god Ares.

"parents" as a foster child. His enemies, however, wish to maintain the fiction that he is of lowly descent, in order to suppress his legitimate pretensions to the crown or to enormous riches.⁹⁴ Cases of this kind often occupy alienists or tribunals.⁹⁵

The female type of the family romance, as it confronts us in this case from the a-social side, has also been transmitted as a hero myth in isolated instances. The story goes of the later Queen Semiramis (in Diodos, II, 4) that her mother, the goddess Derketo, being ashamed of her, exposed the child in a barren and rocky land, where she was fed by doves and found by shepherds, who gave the infant to the overseer of the royal flocks, the childless Simmas, who raised her as his own daughter. He named her Semiramis, which means Dove in the Syrian language. Her further career, up to her autocratic rulership, thanks to her masculine energy, is a matter of history.

Other exposure myths are told of Atalante, Kybele, and Aërope (v. Roscher).

This intimate relationship between the hero myth and the delusional structure of paranoiacs has already been definitely established through the characterization of the myth as a paranoid structure, which is here confirmed by its contents. The remarkable fact that paranoiacs will frankly reveal their entire romance has ceased to be puzzling, since the profound investigations of Freud have shown that the contents of hysterical fantasies, which can often be made conscious through analysis, are identical up to the minutest details with the complaints of persecuted para-

⁹⁴ Abraham, *loc. cit.*, p. 40; Ricklin, *loc. cit.*, p. 74.

⁹⁵ Brief mention is made of a case concerning a Mrs. v. Hervay, because of a few subtle psychological comments upon the same, by A. Berger (*Feuilleton der Neue Freie Presse*, Nov. 6, 1904, No. 14,441) which in part touch upon our interpretation of the hero myth. Berger writes as follows: "I am convinced that she seriously believes herself to be the illegitimate daughter of an aristocratic Russian lady. The desire to belong through birth to more distinguished and brilliant circles than her own surroundings probably dates back to her early years; and her wish to be a princess gave rise to the delusion that she was not the daughter of her parents, but the child of a noblewoman who had concealed her illegitimate offspring from the world by letting her grow up as the daughter of a sleight-of-hand man. Having once become entangled in these fancies, it was natural for her to interpret any harsh word that offended her, or any accidental ambiguous remark that she happened to hear, but especially her reluctance to be the daughter of this couple, as a confirmation of her romantic delusion. She therefore made it the task of her life to regain the social position of which she felt herself to have been defrauded. Her biography manifests the strenuous insistence upon this idea, with a tragic outcome."

noiacs; moreover, the identical contents are also encountered as a reality, in the arrangements of pervers for the gratification of their desires.⁹⁶

The egotistical character of the entire system is distinctly revealed by the paranoiac, for whom the exaltation of the parents, as brought about by him, is merely the means for his own exaltation. As a rule the pivot for his entire system is simply the culmination of the family romance, in the apodictic statement: I am the emperor (or god). Reasoning in the symbolism of dreams and myths, which is also the symbolism of all fancies, including the "morbid" power of imagination—all he accomplishes thereby is to put himself in the place of the father, just as the hero terminates his revolt against the father. This can be done in both instances, because the conflict with the father—which dates back to the concealment of the sexual processes, as suggested by the latest discoveries—is nullified at the instant when the grown boy himself becomes a father. The persistence with which the paranoiac puts himself in the father's place, i. e., becomes a father himself, appears like an illustration to the common answer of little boys to a scolding or a putting off of their inquisitive curiosity: You just wait until I am a papa myself, and I'll know all about it!

Besides the paranoiac, his equally a-social counterpart must also be emphasized. In the expression of the identical fantasy contents, the hysterical individual who has suppressed them, is offset by the pervert, who realizes them, and even so the diseased and passive paranoiac—who needs his delusion for the correction of the actuality, which to him is intolerable—is offset by the active criminal, who endeavors to change the actuality according to his mind. In this special sense, this type is represented by the anarchist. The hero himself, as shown by his detachment from the parents, begins his career in opposition to the older generation; he is at once a rebel, a renovator, and a revolutionary. However, every revolutionary is originally a disobedient son, a rebel against the father.⁹⁷ (Compare the suggestion of Freud,

⁹⁶ Freud: *Three Contributions to the Sexual Theory, Nervous and Mental Disease Monograph, No. 7*. Also: *Psychopathologie des Alltagslebens*, II ed., Berlin, 1909. Also: *Hysterische Phantasien und ihre Beziehung zur Bisexualität*.

⁹⁷ This is especially evident in the myths of the Greek gods, where the son (Kronos, Zeus) must first remove the father, before he can enter

in connection with the interpretation of a "revolutionary dream." *Traumdeutung*, II edition, p. 153. See English translation by Brill. Macmillan. Annotation.)

But whereas the paranoiac, in conformity with his passive character, has to suffer persecutions and wrongs which ultimately proceed from the father, and which he endeavors to escape by putting himself in the place of the father or the emperor—the anarchist complies more faithfully with the heroic character, by promptly himself becoming the persecutor of kings, and finally killing the king, precisely like the hero. The remarkable similarity between the career of certain anarchistic criminals and the family romance of hero and child has been illustrated by the author, through special instances (*Belege zur Rettungsphantasie, Zentralblatt f. Psychoanalyse*, I, 1911, p. 331, and *Die Rolle des Familienromans in der Psychologie des Attentäters, Internationale Zeitschrift für aertzliche Psychoanalyse*, I, 1913). The truly heroic element then consists only in the real justice or even necessity of the act, which is therefore generally endorsed and admired,⁹⁸ while the morbid trait, also in criminal cases, is the pathologic transference of the hatred of the father from the father to the real king, or several kings, when more general and still more distorted.

As the hero is commended for the same deed, without asking for its psychic motivation, so the anarchist might claim indulgence from the severest penalties, for the reason that he has killed an entirely different person from the one he really intended to destroy, in spite of an apparently excellent perhaps political motivation of his act.⁹⁹

For the present let us stop at the narrow boundary line where the contents of innocent infantile imaginings, suppressed and unconscious neurotic fantasies, poetical myth structures, and cer-

upon his rulership. The form of the removal, namely through castration, obviously the strongest expression of the revolt against the father, is at the same time the proof of its sexual provenance. Concerning the revenge character of this castration, as well as the infantile significance of the entire complex, compare Freud, *Infantile Sexual Theories and Analysis of the Phobia of a five year old Boy* (*Jahrbuch f. Psychoanalyse*).

⁹⁸ Compare the contrast between Tell and Parricidia, in Schiller's *Wilhelm Tell*, which is discussed in detail in the author's *Incest Book*.

⁹⁹ Compare in this connection the unsuccessful homicidal attempt of Tatjana Leontiew, and its subtle psychological illumination in Wittels: *Die sexuelle Not* (Vienna and Leipzig, 1909).

tain forms of mental disease and crime lie close together, although far apart as to their causes and dynamic forces. We resist the temptation to follow one of these divergent paths which lead to altogether different realms, but which are as yet unblazed trails in the wilderness.

Periscope

Journal of Mental Science

(Vol. 55. October)

1. Presidential Address—Biological Factor in Heredity. W. BEVAN-LEWIS.
2. Experimental Production of General Paralysis. W. FORD ROBERTSON.
3. The Bacillus Paralyticans. GEO. SCOTT WILLIAMSON.
4. The Cerebro-Spinal Fluid in General Paralysis and Nervous Lues. GEO. SCOTT WILLIAMSON.
5. Mental Symptoms in Cases of Exophthalmic Goitre and their Treatment. JOHN R. GILMOUR.
6. Early Treatment of Mental and Nervous Cases. A. HELEN BOYLE.
7. Alcoholism, Crime and Insanity. L. O. FULLER.
8. Case of Sane Hallucinations due to Alcohol and Atropin. W. R. DAWSON.
9. The Leucocyte and Acute Insanities. COLIN McDOWALL.

1. *The Biological Factor in Heredity*.—This is an extended exposition of the Mendelian law, frequently illustrated by the results of studies among plants and animals. Certain apparent exceptions are shown to depend upon fallacies of interpretation. There follows an application of Mendelian formulæ to disease, the principles being found to apply in the case of rust in wheat diseased pollen, Japanese Waltzing Mice, etc. In albinism the problem is made more difficult and there are possible fallacies due to the fact that albinism must be strictly limited to cases which show no pigment, the defect is very rare and the difficulties connected with human breeding are liable to disturb the Mendelian ratio. Certain diseases are found to have a sex limitation affording another disturbing element in Mendelian calculations. Some hereditary familial nervous diseases are regarded as genuine mutations. When mental disease is considered, the application of Mendelian principles is more difficult, there not being simple factors but an enormously complex aggregate of factors.

2. *Experimental General Paralysis*.—The author made intraspinal injections in rabbits of the *Bacillus paralyticans*. Four of these rabbits were examined after having developed in the course of a few weeks what is called symptoms of general paralysis, i. e., paresis of the hind limbs, drowsy, stupid demeanor and loss of natural appreciation of danger indicating "profound dementia." Some changes resembling paresis were found such as round cell proliferation about vessels of cortex, infiltration of the pia arachnoid and the presence of plasma cells. The findings are unusual but obviously far from conclusive.

3. *The Bacillus Paralyticans*.—An extended investigation was made of the *Bacillus paralyticans* as a possible etiological factor in general paralysis. The writer reaches a number of conclusions which are unfavorable to the preceding paper. He contends that the *Bacillus para-*

lyticans is widely distributed and is a common organism of the normal skin and throat.

It has no particular significance in general paralysis other than together with other organisms possibly taking part in the secondary infections of such cases.

4. *Cerebro-Spinal Fluid in General Paralysis.*—The author investigated the cerebro-spinal fluid of a number of cases of general paralysis and nervous lues, together with various insanities, organic disease and normal fluids. He carried out tests for albumose, nucleo-protein and cholin; the reactions according to Wassermann, Noguchi and Porges Meier; an estimation of the cell count, specific gravity and the reduction of Fehling solution. He concludes that the chemical analysis has little if any definite diagnostic value, although the various abnormalities may be more uniformly present in general paralysis than in other insanities. A positive Wassermann reaction appears to be an almost constant feature of general paralysis and the Noguchi modification is recommended as a simple procedure. Considering the fact that a positive Wassermann means syphilis it is established that general paralysis is an affection almost invariably associated with syphilis.

5. *Mental Symptoms in Exophthalmic Goiter.*—A change in the mental condition, *i. e.*, a motor and mental restlessness is frequently one of the earliest symptoms of exophthalmic goiter. Two cases illustrating an exaggeration of this usual mental change and five cases of insanity are given in abstract. The author states that in his experience agitated melancholia and confusional states are the most common types of mental disease. The prognosis seems more hopeful than formerly considered. In regard to treatment the author recommends rest in bed in the open air, sodium salicylate and the so-called specific treatment, such as thyro-dectin, rodagen and the Moebius anti-thyroid serum which are prepared from the serum or milk of animals from which the thyroid has been removed.

6. *Early Treatment of Mental and Nervous Cases.*—This paper points out the need of treatment for mental and nervous cases before they have reached the stage when it is necessary to commit them. A small institution of twelve beds is described in which facilities are offered for rest in bed, exercise, employment, distraction, amusement, open air, and other treatment. Of 161 consecutive cases there has been an absolute recovery rate of over 40 per cent.

7. *Alcoholism, Crime and Insanity.*—The writer deals with the "reformatory" inebriate and calls attention to the close association between alcoholism, crime and insanity. In his experience only about 35 per cent. can be looked upon as of average mental capacity, from 45 to 50 per cent. being below normal but above imbecility, 15 to 20 per cent. being imbeciles, feeble-minded epileptics, demented or are subjects of recurrent or periodical attacks of mania. On account of the difference in the prognosis, more than one method of treatment is required. Rather than a three years' sentence the form of detention should be indeterminate. The colony system is recommended where the classification of inmates and the teaching of industries could be carried on by a system of grades through which an inmate might earn his freedom by industry and good conduct.

8. *Case of Sane Hallucinations.*—The patient himself who is stated to be a literary man of great ability gives an autobiographical account of his experience while undergoing the hypodermatic treatment of alcoholism

by atropine and strychnine. A detailed and interesting description is given of vivid hallucinations mostly visual in character, lasting about two weeks. The narrator claims they were conscious hallucinations and he knew except in a few instances that he was looking at imaginary things.

9. *The Leucocyte and the Acute Insanities*.—The writer investigated for three years the blood of 48 acutely insane cases described as excitement with confusion (acute mania) and depression with excitement. In excitement with confusion he found invariably a leucocytosis in primary cases, no leucocytosis in secondary or recurrent cases. There is also usually an increase in the percentage of eosinophile cells. In depression with excitement there is also a leucocytosis but no eosinophilia. In cases of mania a marked hyperleucocytosis unaccompanied by any eosinophilia is a bad outlook. In depression with excitement extremes are bad, i. e., hyperleucocytosis and leucopenia.

Two cases are reported in which nuclein and cerein were administered to produce a leucocytosis with some beneficial results.

(Vol. 56, No. 232)

1. Causes of Insanity with Especial Reference to the Correlation of Assigned Factors. SIDNEY COUPLAND.
2. Alcoholic Insanity (Korsakow's Polyneuritic Psychosis). Its Symptomatology and Pathology. JOHN TURNER.
3. The Systematic Estimation of the Leucocytosis in Certain Cases of Insanity: with Special Reference to the Toxemic Theory. S. CARLISLE HOWARD.
4. The Histological Evidence that Toxins reach the Spinal Cord via the Spinal Roots: with Special Reference to Plasma Cells. DAVID ORR and R. G. ROWS.
5. Ependymal Alterations in General Paralysis. HARVEY BAIRD.
6. The Blood-pressure in Mental Disorders. SIDNEY COOK.
7. The Occurrence of Organisms in the Blood and Cerebrospinal Fluid in Mental Diseases. WINIFRED MUIRHEAD.

1. *Cause of Insanity*.—A statistical study by the commissioner in lunacy of the first attack cases for one year (1907) in the institutions for the insane in England and Wales. There were 6,035 males and 6,202 females. A number of interesting and important observations are recorded. As might be expected, in the male sex, toxic etiological factors are more frequent than in the female. On the other hand, mental stress and the effects of the critical period have greater influence on the females. The importance of a consideration of the combination or correlation of two or more factors in the etiology is emphasized. The writer concludes that the presence of an inherited taint accounts for the fact that in the case of a toxin like alcohol or some form of mental stress one individual succumbs under something which another easily withstands. A number of charts, both graphic and statistical, accompany this paper.

2. *Alcoholic Insanity*.—The opinion is advanced that only cases which present the symptom described by Korsakow as polyneuritic delirium should be considered alcoholic insanity. The writer feels that such a form of insanity with distinctive clinical and pathological features is alcoholic whether or not a history of alcoholism can be obtained. There is very little accord among authors as to what constitutes the diagnostic symptoms of other so-called alcoholic psychoses, such as acute hallucinosis, chronic

hallucinoses, alcoholic paranoia, etc., and the present writer contends that while alcohol may be the exciting cause, yet it is not a specific but an accidental stress in an already tottering nervous system. A detailed discussion of symptomatology and pathology follows, and there are several photomicrographs.

3. *Leucocytosis in Certain Cases of Insanity*.—The author discusses the toxemic theory of insanity and abstracts eight cases of various kinds of excitement, i. e., "Mania (Manic Depressive), Mania (confusional), Melancholia (Manic Depressive), and Mania (delirium tremens), with a chart of the leucocyte reaction in each case." The conclusions are:

1. The insane possess an inferior grade of organization of the nervous system, due either to hereditary factors or the devitalization by toxins such as those of syphilis, influenza and the like.

2. The balance of such a nervous system may be overthrown by numerous secondary conditions, one of which may be termed a "toxemia," which is the active cause of a majority of psychopathic conditions.

3. Cases of mania present a hyperleucocytosis which together with the general physical symptoms, abnormal condition of the intestinal bacterial flora, i. e., increased cocci and diminished *B. Coli*, and the presence of specific agglutins in the blood serum, support the theory of toxic origin.

4. The estimation of the polymorphonuclear leucocytosis may aid in differentiating simple alcoholism from more serious conditions which were merely precipitated by alcoholic excess.

5. The prognosis may be determined to a certain degree. Cases in which the leucocyte reaction is not marked show a tendency to chronicity and dementia and, conversely, those in which the leucocyte reaction is high most frequently recover.

6. The attack may be shortened by an artificial stimulation of leucocytosis.

4. *Evidence that Toxins Reach the Spinal Cord*.—A continuation of the experiment published on May, 1907, i. e., placing a cellulose capsule containing a broth culture beneath the sciatic nerve or under the skin of the cheek of rabbits and dogs. The authors hold that the toxins travel in the perineural sheath and there was observed a large collection of plasma cells in its meshes or lymph spaces. The same was true with the posterior ganglion and anterior and posterior spinal roots.

5. *Ependymal Alterations in General Paralysis*.—A discussion of the granular condition found especially in the ependyma of the fourth ventricle of paretics, and the theories as to its formation. The theory is advocated that it is a primary proliferation of the epithelium, being a part of the general proliferative changes characteristic of general paralysis.

6. *Blood Pressure in Mental Disorders*.—The author concludes that there exists no definite relationship between the various forms of mental disorders and the general blood pressure excepting in cases of congenital deficiency, when the pressure as a rule is subnormal. The variations might be accounted for by changes in muscular activity rather than alterations in the mental states.

7. *Organisms in the Blood and Cerebrospinal Fluid*.—No definite conclusions are reached after an extended investigation of fifty-two cases of general paralysis and twenty-nine cases of other insanities, similar diphtheroid organisms being isolated in a certain percentage of both.

(Vol. 56, No. 233)

1. Electric Bath Treatment in 108 Cases of Mental Disorder, Controlled by Warm Baths in 16 Cases. R. L. MACKENZIE WALLIS and EDWIN GOODALL.
2. Observation on the Morbid Anatomy of Mental Disease. GEORGE A. WATSON.
3. The Care and Training of the Feeble-minded. ARCHIBALD R. DOUGLAS.
4. Lunacy Administration in Cape Colony. T. DUNCAN GREENLEES.
5. The Significance of Heredity and the Neuro-insane. Constitution as Important Factors in the Production of Mental Disease, with an Examination into the History of 100 Consecutive Cases. G. RUTHERFORD JEFFREY.
6. The Causes and Treatment of Asylum Dysentery. SIDNEY J. STEWARD.
7. Auto-suggestion and Delusional Insanity. DAVID THOMSON.

1. *Electric Bath Treatment.*—The electricity is applied in the form of the alternating and sinusoidal current while the patient is in a bath of warm water at a comfortable temperature. Each bath lasts for twenty minutes. The results in 108 cases of insanity are recorded, mostly cases of melancholia. Of these 57.4 per cent. recovered or showed mental improvement, a large proportion of which also showed increased weight. Compared with 16 cases which were given simple warm baths at the same temperature, only about half as many showed increased weight and less than a third as many improved.

Mr. Mackenzie Wallis discussed the question of the influence of such baths upon the excretion of creatinine. The following are the author's own conclusions:

1. The excretion of creatinine in the insane is in general subnormal.
2. Electric bath treatment using the sinusoidal current tends to increase the creatinine in the urine.
3. Treatment with warm baths without the current has very little if any influence on the creatinine excreted.
4. The variations in volume of the urine excreted and the great proneness to bacterial decomposition seem to be characteristic of the insane.

2. *Morbid Anatomy of Mental Disease.*—This paper is based upon 301 autopsies performed by the writer, all cases in which a gross lesion, such as might be formed in epilepsy, general paralysis, etc., being excluded. The brains were examined as to weight before and after stripping the membranes, as to convolitional pattern of the cerebral hemispheres, mental state of the patients, etc., the report being based upon "intracranial appearances."

The brains were divided into five groups, varying from group one in which there were no morbid appearance to group five in which there were gross changes and very marked cerebral wasting. The author's conclusions may be briefly stated as follows:

The brains showing the most wasting and presumably accompanied by the greatest dementia were originally the heavier ones. The brains (groups one and two) having the least changes were under average weight and indicate probable subevolution and amentia. The brains in these same groups show a convolution development which is average or below the average, while the brains of those groups characterized by the most marked changes showed a better convolution appearance and were more free from cerebral stigmata. Neither the age of the patient nor the duration of the attack of insanity is in itself an important factor concerned in the production of or in hastening the progress of cerebral dissolution.

Atheroma and age may be independent of one another. Simple senility is not necessarily associated with gross degeneration of the cerebral vessels, and cerebral vascular degeneration does not always lead or hasten the progress of cerebral dissolution. It is true, however, that cerebral vascular degeneration and cerebral dissolution are commonly concurrent phenomena. In the majority of cases cerebral dissolution only reaches a moderate stage in the absence of gross degeneration of the cerebral vessels.

A comparison is made between the results obtained at Claybury Asylum and at Rainhill Asylum with no marked differences being found, except such as might be accounted for by local peculiarities and which would not appear to alter the general conclusions.

3. *Care and Training of Feeble-minded.*—A discussion based upon the writer's experience and practise at the Royal Albert Institution, Lancaster. The corrective influence of the routine life in a well-regulated institution and the value of industrial training are emphasized.

4. *Lunacy Administration in Cape Colony.*—After a brief historical résumé, the writer discusses the various provisions of the Lunacy Act of 1897. The "Asylum Service" itself seems to be unusually progressive in many respects. Provision is made for the liberal pensioning of both officers and employees. Systematic training is provided for nurses and the graduate mental nurse is on the same legal level as the general hospital nurse.

5. *Heredity and Neuro-insane Constitution.*—Using one hundred consecutive cases, fifty of each sex, as a basis, the author arrives at some far-reaching conclusions. Starting with the proposition that "like tends to beget like, even when that like is an unstable nervous system," he emphasizes the importance of heredity. He found a heredity history of insanity or well-marked neurosis in 55 per cent. of the direct ancestors (father, mother and grandparents). If the more distant relatives (aunts, uncles, cousins, etc.) were included, 71 per cent. had an insane or neurotic heredity. In 93 per cent. there was an undoubted neuro-insane or unstable constitution. Such a constitution may be the result of bad heredity or acquired through adverse circumstances. Given a bad heredity something, such as business or domestic worry, love affairs, alcohol, etc., act as special causes. Forty per cent. showed grave physical disease in the ancestry.

6. *Asylum Dysentery.*—A discussion of the diarrhea so frequently found among asylum inmates during the summer months. The writer examined one hundred cases and concluded that there were two main causes: first, exposure to air which has been vitiated by pollution with fecal gases and dust combined with contact with excreta and spread from person to person; secondly, a diseased state of the gastro-intestinal tract common among the insane who suffer from chronic constipation (the "exposure to vitiated air" explanation seems rather remarkable and unnecessary when the very probable and practicable contact theory is available).

Segregation of cases, strict cleanliness and disinfection are to be followed rigidly. The present writer has had good results with the continuous use of saline purgatives for a number of days, the effect being a constant drainage of all toxins, etc., followed if necessary by a few doses of an astringent mixture.

7. *Auto-suggestion and Delusional Insanity.*—The effort was made in two cases, one with paranoid delusions with somatic ideas, the other with

ideas of self-accusation, to counteract these delusions with auto-suggestion. The patients were made to suggest to themselves such thoughts as "I am strong and happy" with little or no permanent benefit.

W. C. SANDY (Kings Park, N. Y.).

Deutsche Zeitschrift für Nervenheilkunde

(Band 46, Heft 1)

1. *Cysticercus Cerebri*. MARGULIS.
2. Histopathology of Neuritis. DOINIKOW.
3. Spastic Spinal Paralysis. SARBO.
4. Acute Disseminated Sclerosis. RÖNNE AND WINNER.
5. Pupillary Disturbance as a Localizing Sign of Homonymous Hemianopsia. BEHR.
6. Observations on Traumatic Neuroses. RUMPF.

1. *Cysticercus*.—Clinical report.

2. *Neuritis*.—The writer reports the pathological findings of a case in which, among other stains, he used the Bielschowsky method. This study was made in order to throw further light on the question of regeneration in neuritis. The thin non-medullated fibers noted in the involved nerves are, according to him, for the most part either regenerated fibers or normal fibers which have resisted the noxious agent.

3. *Spastic Spinal Paralysis*.—Clinical report of a case which showed the pure picture of a spastic spinal paralysis of Erb, and in which overexertion was the causative factor.

4. *Acute Disseminated Sclerosis*.—The writer reports a case of acute disseminated sclerosis in which the clinical picture resembled more a spinal gliosis. Pathologically it showed the picture of an acute myelitis, together with that of a disseminated sclerosis. The writer discusses the various views on disseminated sclerosis and agrees with Marburg that it must be interpreted from the myelitic theory.

5. *Homonymous Hemianopsia*.—This sign is an important localizing sign. Further differentiation as to whether the cortical or basal portion of the optic tract is involved can be made. This differentiation is possible through the knowledge of (1) the presence or absence of hemiakinesis; (2) the reflex movement of the eye in the hemianopsic visual field; (3) disturbance of adaptation to darkness; (4) atrophic changes in the ophthalmoscopic picture; (5) a characteristic difference in the width of the pupils and lid furrows. There is in this latter test a fairly accurate method of estimating the position of the hemianopsia. On the side of the hemianopsia the pupil is larger. The author reports several cases with necropsy.

(Band 46, Heft 2)

1. *Cysticercus Meningitis*. ROSENBLATT.
2. Multiple Sclerosis and Pregnancy. BECK.
3. Multilobular Fibroma of the Cord. MERZBACHER AND CASTEX.
4. Absence of Brain and Cord. MODENA.
5. Congenital Spastic Paraplegia. FINKELNBURG.
6. A New Reflexometer. GOLDBLATT.

1. *Cysticercus Meningitis*.—Writer reports a case in which the spinal cord showed greater involvement than the brain. Likewise the spinal symptoms dominated the clinical picture.

2. *Multiple Sclerosis*.—Statistical study in which the writer endeavored to find the relation and influence of pregnancy and labor upon this disease. Pregnancy showed more influence upon the symptoms than labor. A general evil effect of pregnancy and labor could not be noted.

3. *Multilobular Fibroma*.—The unusual features were the long duration (17 years) of the illness, and the mild character of the pain. The latter symptom was obtained only after careful questioning.

4. *Congenital Spastic Paraplegia*.—The writer reports a case with necropsy. The pyramidal tracts were intact, but a partial atrophy of the cortex was noted.

(Band 46, Heft 4 and 5)

1. Changes in the Nervous System in Pernicious Anemia. LUBE.
2. Innervation of the Bloodvessels. MÜLLER and GLASER.
3. Clinical Studies of Accidents Due to Electricity. MALY.

1. *Nervous System in Pernicious Anemia*.—The writer reports several cases with pathological studies and concludes as follows: "The changes found in the venous were not the result of the anemia, but were due to the same poison that caused the anemia. The nature of the toxic agent was unknown; syphilis was the cause for some cases. The poison was carried by the blood and had a special affinity for the white substance. It not only affected the cord, but also the brain. The nervous tissue was not always affected primarily, sometimes the lesions were secondary to the vascular changes.

2. *Innervation of the Bloodvessels*.—This work is a microscopical study of the centers and tracts innervating the bloodvessels as well as a cerebral digest of the work done by others on this subject. The subject is divided into the following sub-headings:

1. The influence of the brain on the vasomotors.
2. Vasomotor centers in the medulla.
3. Spinal vasomotor centers.
4. Vasomotor tracts.
5. Antagonistic innervation of the vessels.
6. Peripheral pathways of the nerves.
7. Sensation in the vessels.

3. *Trauma from Electricity*.—The writer reports several cases which showed definite symptom complexes resulting from the passage of large currents. The symptoms presented were similar to those noted in the traumatic neuroses. The author thinks that beside these functional cases there were some in which definite organic changes were to be noted.

S. LEOPOLD (Philadelphia).

Review of Neurology and Psychiatry

(Vol. X, No. 8)

1. Familial Amaurotic Ataxic Paraplegia. PURVES STEWART.
2. Acute Bulbar Palsy Following in the Wake of Mumps. JOSEPH COLLINS AND ROBERT G. ARMOUR.

1. *Familial Amaurotic Ataxic Paraplegia*.—The writer summarizes his report as follows:

Out of a family of four children, the oldest, aged 29, is healthy, whilst the other three, a sister, aged 28, and two brothers, aged 19 and 14 respectively, show the following signs and symptoms:

1. *Primary Optic Atrophy* with marked impairment of vision. The visual defect in the two older children dates from infancy; in the youngest child it did not supervene until the age of 7 or 8 years.

2. *Divergent Strabismus*, evidently due to the loss of binocular vision. Such strabismus, without ocular paralysis, is common in cases of blindness from optic atrophy.

3. *Deformity of the feet*. Talipes equino-varus, varying in degree in the different cases.

4. *Absence of scoliosis*, even in advanced stages of the disease.

5. *Evidence of cerebellar degeneration*. Unsteadiness of the upper limbs (except in the youngest of the series) and of the lower limbs in all three cases. The ataxia is uninfluenced by closing the eyes.

6. *Signs of pyramidal degeneration*. Extensor plantar reflexes in all three. Ankle clonus was present in Case 2. On the other hand, in Cases 1 and 3 the ankle jerks were diminished or absent.

7. *Alteration of the gait*, together with contracture of the calf muscles.

8. *Nystagmus* was well marked in one case (the most recent of the three). In Case 1 it was poorly marked. In Case 2 it was absent.

All the patients are still alive. The description of their disease does not correspond to any of the commoner types of familial nervous disease hitherto described, *e. g.*, Marie's cerebellar ataxia, Friedreich's ataxia, Sanger Brown's cases. However, the nature of the morbid process is probably similar to that which has been so often found in Friedreich's ataxia, *viz.*, a primary and progressive systemic degeneration in the afferent cerebellar paths within the spinal cord, or, perhaps, in the cerebellar cortex itself; and degeneration in the pyramidal tracts. These conclusions are based on the presence of incoördination with absence of sensory changes, and the invariable occurrence of extensor plantar reflexes.

2. *Acute Bulbar Palsy*.—Nervous symptoms came on a week after the onset of a mild attack of "mumps" in a previously healthy boy of 11, and resulted in death five days later. The symptoms eventuated as follows: Dizziness, accompanied next day by headache; followed, second day, by uncertainty in station and gait and tendency to fall to the left; left facial palsy; nystagmus looking to the left; third day, dysphagia, dysarthria, and tachycardia, with stupor, all gradually increasing. The brain only was examined. The pia and brain surface were edematous and engorged. Round-cell infiltration was found at the superior level of the olives, diminishing in intensity cephalad to the posterior quadrigemina and caudad to the caudal end of the pyramidal decussation. The writers' conclusion is that the pathological process in the case was, in short, that of poliomyelitis, and as such it may be taken to show that the disease known as poliomyelitis may occur sporadically, and be caused by different organisms. The symptoms in any given case they state will naturally vary with the state of the disease.

C. E. ARWOOD (New York).

Monatsschrift für Psychiatrie und Neurologie

(Vol. 33, No. 1, January, 1913)

1. Contribution to the Knowledge of the Medulla Oblongata in Birds. R. SINN.
2. Some Cases of Induced Insanity. P. SCHÖNHALS.
3. The Etiology of Multiple Sclerosis. E. RÖPER.

4. The Influence of Anecdotes upon the Train of Ideas in Insane Patients.
A. KUTZINSKI.

1. *Medulla Oblongata in Birds*.—Weigert series were made from a number of different species of birds, including the hen, duck, ostrich, swan, heron, and hawk. At the junction of cord and medulla in fowls there is a ventral projection to the posterior horns, designated as middle horns. There is a well-formed inferior olive, the pyramidal tract is only rudimentary. The cranial nerve nuclei which lie in the medulla present interesting characteristics which are described in detail. The article is illustrated by photo-micrographs.

2. *Induced Insanity*.—The author's first instance was that of a whole family, mother and three sons, who were under treatment at one time. Each individual had ideas of reference and persecution. Someone was placing poison about the house and threw an evil smell into the rooms. The eldest son, who exerted a great deal of authority over the other members of the family, had had paranoid ideas for many years. Through association with him the other members of the family gradually became possessed of the same ideas. All except the original patient recovered or improved rapidly when away from this one's influence. This is a typical instance of the French folie imposée. Four other cases of a somewhat similar nature are given. They were the only instances of this "induced insanity" occurring in a large clinic (Jena) in the course of 13½ years, showing that they are quite uncommon. They comprised only .028 per cent. of the admissions.

3. *Multiple Sclerosis*.—The literature on the subject and the opinions of all the leading neurologists are reviewed. To this the author adds his own experience and a tabulated summary of 52 cases is given. The family histories in these cases are perhaps more complete than cases from other sources, since they occurred in a psychiatric clinic where especial attention was given to these data. The etiology of multiple sclerosis is still undetermined and the only statements regarding it must be theoretical. The facts seem to indicate that the disease cannot be produced by external influences alone. All such factors that have been mentioned are such as occur to thousands of persons (exposure, fright, infectious diseases, trauma) and if they alone could initiate multiple sclerosis it would be a much more common affection than it is. A combination of a congenital or inherited susceptibility on the part of the nervous system and a precipitating factor seem to be necessary. The two are of about equal moment. Edinger's exhaustion theory may well be applied to this disease.

4. *Train of Ideas*.—A continued article.

(Vol. 33, No. 2, February, 1913)

1. The Results of Transitory Interruptions of the Blood Supply to the Central Nervous System in Man. H. BERGER.
2. Pathogenesis and Therapy of Epilepsy. G. C. BOLTEN.
3. The Influence of Anecdotes upon the Train of Ideas in Insane Patients. A. KUTZINSKI.

1. *Interruption of Blood Supply to the Brain*.—The importance of free blood supply for the working of the brain is indicated by its elaborate system of arterial anastomoses and has been demonstrated experimentally. On account of the difficulty in interrupting all the afferent vessels of the brain and the fact that an animal usually dies at once when this is accom-

plished has rendered experimentation unsatisfactory. The successful results have been with animals which have been chloroformed and then resuscitated. An opportunity came to the author to examine the central nervous system in a young boy in whom these conditions had been fulfilled. Respiration and heart-action had ceased under chloroform narcosis. Other means failing, after about 10 minutes, the chest was opened and the heart massaged directly. It was an hour before the action was completely restored. The boy lived two days in a rather somnolent state with blunted faculties, exaggerated reflexes, but no spasms and no other important neurological signs. Thorough examination of the brain by the usual histological methods, including neuro-fibril staining, revealed no cellular or other intrinsic alterations in the brain substance itself. Three small hemorrhages about 1 mm. in diameter were found, which were seen microscopically to be due to the rupture of the walls of thrombosed veins.

2. *Epilepsy*.—An extensive review of the literature and of the author's experience with a large number of cases during seven years. True epilepsy is a toxicosis, caused presumably by products of normal metabolism; the nature of the toxine is not known. The toxic material is insufficiently eliminated or neutralized on account of inadequate action of the thyroids and parathyroids which protect the nervous system against toxins. The insufficiency of these glands may, in turn, be secondary to disturbances in the sympathetic ganglions. The softenings found in the cortex in true epilepsy are not the cause of the disease but additional results of the chronic intoxication. In view of the above facts the author reports very marked improvement or complete cessations of symptoms resulting in forty cases treated with the expressed juice of beef thyroids. The extract was given by rectum to avoid the action of the gastric juice. In some cases the results were immediate, in others it was several months before an effect was noted. The dosage must be varied for each individual, as there are wide differences in susceptibility.

3. *The Influence of Anecdotes upon the Train of Ideas in Insane Patients*.—A continued article.

(Vol. 33, No. 3, March, 1913)

1. Asymmetrical Diastematomyelia of the Type of Anterior Horn Separation. R. HENNEBERGER AND M. WESTENHÖFER.
2. The Conduction Paths of the Psychogalvanic Reflex Phenomenon. V. J. MÜLLER.
3. The Influence of Anecdotes upon the Train of Ideas in Insane Patients. A. KUTZINSKI.

1. *Diastematomyelia*.—Descriptions of malformations of the cord of spinal bifida type have been confined practically to new-born children. The case in question was a girl of 17 with a small congenital tumor in the sacral region. This was operated upon and opened, but death resulted soon after from purulent cystitis and nephritis. There was a cleft in the 4th and 5th lumbar vertebræ. The cord in the lumbar segments was divided completely but unevenly in two. The right side was fairly complete, but in the left division there was only the anterior horn surrounded by white matter. In the first sacral segment the cord was still divided in two but each part gave a complete cross-section of spinal cord. Below these united and all four posterior horns disappeared. In the middle sacral segment the cord again divided in two, but without posterior horns. In the lowest

sacral segment there was uncertain anlage of posterior horns. The case is a very rare one and is described in careful detail with numerous photographs.

2. *Psychogalvanic Reflex Phenomenon*.—An interesting series of experiments throwing some light on the hitherto rather mysterious psychogalvanic reflex. Monkeys (*Macacus cynomolgus*) were employed. The results in human subjects were unsatisfactory. The usual galvanometer, electrodes, etc., were used which are a part of apparatus for psychogalvanometric observations in human beings. It was first ascertained that the monkeys gave satisfactory reactions to optic, acoustic, pain and other stimuli. The nerves supplying the palms and soles were then anesthetized by perineural injection of novocaine. The result was a loss of reflex. It was also found that cutting the nerves abolished the reflex, probably permanently, but that, after a few days, the dorsal surfaces of the hands and feet, which normally do not give the reflex response, became active in this respect—possibly by diaschisis. The effect of the perineural injection reveals a peculiarity. It is known that such anesthetics have a selective action for centripetal impulses and that centrifugal or motor impulses are not interrupted. The fact that the psychogalvanic reflex, which must comprise a centrifugal impulse, is interrupted would indicate that there are some fibers in the sensory nerves of the palms and soles which behave toward the anesthetic like the other sensory fibers, but carry centrifugal impulses.

3. *Train of Ideas*.—A psychological investigation allied to that undertaken by Koppen and the author of the present article. This previous work was published in monograph form and was reviewed in this JOURNAL in July, 1911. The present study consisted in having a patient read and then repeat a brief anecdote, one containing a rather dramatic incident being chosen. Two days later an association test was performed, using thirty words, some of which had a bearing on the anecdote. The word "complex" is used throughout the article, somewhat confusingly, to refer to the concepts aroused in the patient's mind by the story. In the association test the "complex" reactions only occurred occasionally and were of a monotonous character. Measuring the time of the reaction yielded no points of value. Instructing the patient before each word of the association test to fix his mind on the story usually but not always increased the "complex reactions." No very important deductions are made from the work, and it is admitted that the method has not, as yet, any diagnostic value.

J. W. MOORE (Central Islip).

New York State Hospital Bulletin

(Vol. V, No. 3, November, 1912)

- *1. Mental Diseases and Criminal Responsibility. DR. JOHN V. MAY.
- *2. Dementia Præcox Deteriorations without Trends. DR. GEORGE H. KIRBY.
- *3. The Problem of Toxic-Infectious Psychoses. DR. AUGUST HOCH.
- 4. Cases allied to Manic-Depressive Insanity. DR. C. P. OBENDORF.
- 5. Psychoses Occurring in Twins. DR. PHILIP SMITH.
- *6. Chronic Paranoid Dementia following Acute Alcoholic Hallucinoses. DR. WILLIAM C. GARVIN.
- 7. The Prevention of Insanity. DR. WILLIAM L. RUSSELL.
- 8. Report of Inter-hospital Conference at St. Lawrence State Hospital.

- (a) A Discussion of Paranoic Conditions with Special Reference to Mental Deterioration. DR. CARL G. TADDIKE.
 - (b) A Consideration of Paranoid Ideas in Manic-Depressive Psychoses. DR. CHESTER WATERMAN.
 - (c) A Demonstration of Work Done by Patients in Kindergarten. DR. R. H. HUTCHINGS.
 - (e) Paresis and Syphilis. DR. ROBERT KING.
 - * (f) Report of Cases of General Paresis, Cerebral Syphilis, Bulbar Paralysis, Central Neuritis and Chorea. DR. CHARLES B. DUNLAP.
 - * (g) Seven Cases of Cerebral Syphilitic Arteriosclerosis, One Case of Presenile Dementia and Four Cases of Brain Tumor. CHARLES I. LAMBERT.
9. Inter-hospital Meeting Conference.
10. Reorganization of Commissioner Bissell.
11. Reviews.

*1. *Mental Diseases and Criminal Responsibility.*—May has given an interesting and concise account of the relation of criminal to mental disease with special stress upon disturbances of personality as predisposing factors. He further refers to the legal definition of crime and demonstrates its validity. More attention should be paid to the defective delinquent, his responsibility and disposal not to a prison merely to serve his sentence, nor to a hospital for the insane for treatment. He should be sent to an intermediate institution where special education adapted to his mental capacity and an industrial training which would permit him to learn a trade which he would follow should he demonstrate efficiency and ability to adapt himself to his environment.

*2. *Dementia Præcox Deteriorations without Trends.*—In this article Kirby refers to a group of cases in which the symptom-complexes began by definite signs of a "shut-in" personality and later sexual inadaptation. In these cases there is no incoherence of thought, no peculiarities of language, no trends, but peculiarities in personality, faulty mental habits and unhealthy attitudes are the all important factors in the deterioration.

*3. *The Problem of Toxic-Infectious Psychoses.*—Hoch refers first to the typical organic reaction as seen in Korsakoff syndrome, later to deliria occurring in chronic alcoholism, as a result of drugs, and in infectious diseases at the height of a process. He also refers to similar pictures of a non-toxic etiology occurring in dementia præcox.

*6. *Chronic Paranoid Dementia following Acute Alcoholic Hallucinosi.*—The author quotes three cases in which their paranoid traits followed upon an attack of acute alcoholic hallucinosis. His conclusions point towards minimizing the importance of alcohol as an etiological factor in mental disease or rather recognize it as a psychotic symptom; he refers briefly to the views of Freud on the relation of alcoholism to the sexual component.

*8. (f) *Report of Cases of General Paralysis, Cerebral Syphilis, Bulbar Paralysis, Central Neuritis and Chorea.*—After referring briefly to the mental pictures in these cases he gave a summary review of the pathological findings and pointed out that the psychoses could not be brought into obvious relation with the anatomical lesions and referred to the facts that only in general paralysis where there were coarse destructive lesions could there be any correlation with the diffuse mental deterioration.

*8. (g) *Seven Cases of Cerebral Syphilitic Arteriosclerosis, One Case of Presenile Dementia and Four Cases of Brain Tumor.*—These seven

cases demonstrated clearly a symptom-complex picture of subjective complaints and objective evidences, such as fatigue, forgetfulness, lapses in train of thought, etc. Also vivid hallucinations and irritative phenomena which are relatively infrequent in general arteriosclerosis.

The four cases of brain tumor, one in the right Rolandic area, evinced both pressure and irritative phenomena; in the second the tumor was in the left paracentral frontal area and prior to death revealed no neurological signs. The third and fourth cases were frontal tumors in which the complexity of symptoms, both physical and mental, cloud their localization.

FARNELL (Butler Hospital).

Revue Neurologique

(April 15, 1913)

1. Painful Crural Monoplegia with Contracture in Flexion and Anesthesia of Radicular Distribution. Clinical Diagnosis: Compression of the Fourth Lumbar Root by Spinal Pachymeningitis Secondary to a Neoplasm of the Uterus. Autopsy: A Neuritis of the Crural which was Involved by a Large Latent Cancer of the Cecum. G. RAUZIER and H. ROGER.
2. Study of the Action of the Serum of Maniacs in Melancholia and of the Serum of Melancholia in Mania. C. PARHON, E. MATÉESCO and A. TUPA.

1. *Painful Crural Monoplegia*.—A woman, sixty-three years old, complained of metrorrhagia, pain in the right thigh and disability. Objective findings were: unilateral abolition of the knee jerk with preservation of the Achilles jerk; muscular atrophy in the right thigh; and a band of hypesthesia on the anterior surface of the thigh and descending to the upper part of the internal surface of the leg. Examination of the cerebrospinal fluid was negative. Necropsy showed a cancer primary in the cecum involving the crural nerve.

2. *Action of Serum of Melancholics and Maniacs*.—In a case of melancholia six injections, both intravenous and subcutaneous, of from 10 to 32 c.c. of serum from different maniacal patients was given. After the second injection there was a sudden improvement. Not much change was noticed after the other injections. In several cases of mania the injections of serum of melancholic patients caused no special change.

(April 30, 1913)

1. Brown-Séquard's Syndrome with Syringomyelic Dissociation of Sensation. (Conduction of Sensation in the Spinal Cord.) A. SOUQUES and MIGNOT.
2. On the Reactions of the Lower Extremities to External Stimuli in the Normal and in Cases of Spastic Paraplegia. Normal and Pathologic Movements of Defense. G. MARINESCO and NOÏCA.

1. *Brown-Séquard Syndrome*.—Case of traumatism to the spine followed by spastic paralysis of the right leg and loss of pain and thermal sense in the left leg. Tactile and deep sensibility conserved in both legs.

2. *Reactions of Defense in the Lower Limbs*.—In cases of spastic paraplegia and in normal individuals the application of an Esmarch bandage will cause the abolition of tendon reflexes and an exaggeration of the movements of defense. In advanced cases of paraplegia where

voluntary movement is lost or practically so, the production of an anemia in the lower extremities by the Esmarch bandage causes a disappearance of the Babinski reflex and a diminution of the reflex of defense; on the other hand, in cases of spastic paraplegia in which a good part of the motility is preserved, an anemia produced by the same procedure causes a disappearance of the Babinski reflex, but the reflex of defense is exaggerated. This is explained by the theory that there are two categories of movements of defense. The one is conscious, partly controlled by the will and is due to the sensation of pain; the other is involuntary and not accompanied by any conscious sensation.

(May 15, 1913)

1. The Presence of the *Treponema pallidum* in a Case of Syphilitic Meningitis Associated with General Paralysis and in a Case of General Paralysis. G. MARINESCO and J. MINEA.
2. Primary Progressive Myopathy in Two Brothers, with Autopsy. P. HAUSHALTER.

1. *General Paralysis and the Treponema pallidum.*—The authors' earlier researches did not demonstrate the presence of the spirochæta in the brain in cases of general paralysis but more recently in the examination of twenty-six cases they were able to demonstrate the presence of the spirochæta in two; in one of the cases there was found at autopsy a complicating syphilitic meningitis. The inefficacy of treatment, mercury, arseno-benzol, etc., is due to a special resistant quality in the spirochæta acquired during its evolution. The lesions of general paralysis depend directly on the presence of the spirochæta.

2. *Primary Progressive Muscular Atrophy in Two Brothers.*—Seven children in the family, three died in childhood of "meningitis" and two were well. In the one case there was an atrophy of the muscles of the upper extremity, the shoulder girdle and of the walls of the thorax with relative preservation of the muscles of the lower extremity. The second case showed pseudohypertrophy of the calf muscles and atrophy of the erector spinæ muscles. The appearance of the patient and his manner of rising, etc., were typical of pseudohypertrophic muscular dystrophy. The first case was more of the type Leyden-Moebius. In both cases electrical reactions of degeneration were present in the muscles most affected although the nervous system was found normal. The muscles showed marked changes. There was a fibro-adipose degeneration, hypertrophy of some fibers and atrophy of many. In one of the brothers a patch of fibroid change was found in the myocardium.

(May 30, 1913)

1. Abscess of the Parietal Lobe. Hemianesthesia, Dysmetria and Bradykinesia, Asynergy and Apraxia. ANDRÉ-THOMAS.
2. Contribution to the Symptomatology of Organic Paralysis of Central Origin in the Upper Limbs. J. M. RAÏMISTE.
3. The Presence of *Treponema pallidum* in the Brains of General Paralytics. G. MARINESCO and J. MINEA.

1. *Abscess of the Parietal Lobe.*—The symptoms followed immediately after an injury to the head. There was very slight weakness in the right arm but marked disturbance in sensation in the entire right side of the body. Touch, localization of sensation and the sense of motion and

position were most affected. Pain and temperature sense and vibratory sensibility were preserved. There was astereognosis in the right hand. Movements in the right extremities were slow, the dysmetria was similar to that seen in cerebellar disease except that the stopping of movement was not brusque. Associated movements were present. There was no motor or auditory aphasia. Apraxia was present. Autopsy showed an abscess the size of a small orange beneath the superior parietal convolution distending the superior parietal lobe and the precuneus.

2. *Symptoms of Organic Paralysis of Central Origin.*—Further observations on a sign described by the author in the *Revue Neurologique*, 1909, No. 22. It is present in all cases of organic paralysis of the upper extremity. It is not present in cases of paresis of the upper extremity unless the patient's attention is distracted. It is present in hysterical paralysis unless the patient's attention is distracted by the performance of some voluntary activity at the same time, in which case it is absent during this period.

3. *Treponema pallidum in the Brains of General Paralytics.*—The discovery of Noguchi confirmed by the authors, that the spirochete is present in the brains of general paralysis, opens a new horizon from the point of view of its nature, course, pathologic anatomy and treatment. The spirochete lies along the sheaths of the bloodvessels. The fact that they are only found in a few cases may be explained as due to faulty staining, or to insufficient search, as they are unequally distributed. The inefficiency of treatment by salvarsan in general paralysis is explained by saying that the spirochete become toxico-resistant during the course of their evolution.

C. D. CAMP (Ann Arbor, Mich.).

MISCELLANY

THYROID HYPOSECRETION. O. T. Osborn. (J. A. M. A., November 2.)

After noticing the recognized physiologic activities of the thyroid, as well as those it may be supposed to have, and the various mental and physical conditions which may influence its secretion, Osborn suggests that while the organ may be histologically normal, it may be furnishing a secretion that is disturbed, thus accounting for some obscure symptoms. It is not remarkable, he says, when we consider the very active part that it takes in their lives, that thyroid instability so frequently occurs in women. Its variations can account, as no other etiologic factor can, for the so-called neurotic cases who suffer from so many unaccountable symptoms, one replacing another in succession. Treatment by feeding thyroid extract was used in cases of defective children, eczema, asthma, indigestion, epileptic attacks and various other obscure conditions with more or less success on the presumption of hyposecretion of the gland. Osborn says that administration of thyroid promptly relieves conditions of mental depression and hysteria due to this cause. The most frequent of all hypothyroidism symptoms are those associated with added weight which may range from simple obesity coming on after the menopause to lipomatosis, myxedema, etc. The symptoms of typical hypothyroidism, besides the adiposis, are scanty or absent menstruation, drowsiness, slow pulse, dry skin, local puffiness and perhaps slow mentality. In conclusion, he cautions against the careless use of thyroid, which he says should be added to the list of poisons and never sold unless with physician's prescription. It is potent for harm, and a little too much may push a wavering

thyroid gland to hypothyroidism. On the other hand, much of the thyroid substance on the market is not active, but the simultaneous addition of a little iodid will make it so.

MULTIPLE CEREBROSPINAL SCLEROSIS. F. X. Dercum. (J. A. M. A., November 2, 1912.)

The author publishes a carefully reported case of multiple cerebrospinal sclerosis, presenting such marked symptoms of paresis that it was even diagnosed as such by this experienced neurologist. The diagnosis was favored to some extent by the fact that the patient's father had been treated many years before by Dr. Dercum, for a primary specific sore, and later developed tabes. In the period between these events the patient was born. Microscopic examination of the brain and cord, however, revealed the actual conditions, a multiple cerebrospinal sclerosis. The case illustrates the importance of the cortical localization of lesions in relation to the symptoms produced. Thus, as Dercum points out, other more or less similar cases have been reported resembling mixed forms of multiple sclerosis and paresis as regards their clinical features and capable in causing confusion in diagnosis.

A CASE OF TRAUMATIC CEREBRAL ABSCESS. G. Fiore. (Clinica Medica Italiana, II, 1911.)

A child seven years old was hit with a stone in the occipital region. The wound suppurated, but healed rapidly under treatment. One month after the injury the child was suddenly seized with a violent headache, and the temperature rose abruptly to 39.9 degrees, then fell below normal, and continued throughout the course to fluctuate, with a tendency to hypothermia.

On admission the child presented a group of apparently constant symptoms: slight facial paralysis, more marked in the inferior branches, a moderate bilateral ptosis, paralysis of the right abducens, left hemiopia and dragging of the left leg in walking. The cutaneous and tendon reflexes on the left side were exaggerated. A marked and progressive increase in the intracranial pressure was indicated by slow and irregular pulse, headache, vomiting, stupor and unconsciousness, dissociated movements of the eyeball, divergent strabismus, mydriasis and choked disc. A lumbar puncture was followed by a temporary improvement. The pressure was 25 mm. Hg. and the fluid showed the characteristic signs of inflammation. Two other symptoms of great interest were the local rise of temperature in the left occipital region, and a manifest influence of the position of the head on the pulse, which became almost imperceptible when the head was rotated and flexed to the left (with the patient in the supine position) so that the occipito-frontal diameter became almost horizontal.

The author calls attention to the possibility of cerebral abscess following head injuries of apparently slight importance, especially suppurating scalp wounds, and without any bone lesion. This case illustrates further that the abscess may manifest itself by sudden and well marked, though transitory rise of temperature and signs of cerebral compression. The factors causing rise of temperature in brain abscess are of great importance and indicate that the abscess disturbs the thermo-regulating mechanism of the cerebellum. The local rise of temperature is probably the most valuable diagnostic sign.

The author also calls attention to the marked, though temporary, benefit of lumbar puncture on the course of uncomplicated cerebral abscess, and also to the fact that in this case the presence of a suppurating focus was not indicated by any changes in the blood or the urine.

The diagnosis of operable, medium-sized abscess of the right occipital lobe was made, and confirmed at the operating table. Unfortunately however purulent meningitis developed and the issue was fatal.

JELLIFFE.

Book Reviews

THE INTERNAL SECRETORY ORGANS. THEIR PHYSIOLOGY AND PATHOLOGY.
By Professor Artur Biedl. Translated by Linda Forster. William Wood and Company, New York, 1913.

We welcomed the appearance of the German original of this volume as one of the medical events the year of its appearance. The large field of the blood or endocrinous glands was finally presented in a systematic and comprehensive manner. It brought together facts of supreme importance to all students of medicine, and finally offered to the neurologist and psychiatrist a foundation for their understanding of many of the problems of the sympathetic nervous system.

At the lowest levels of organic life, *i. e.*, the oldest one's, physico-chemical processes constitute the fundamental mechanisms. Most of these are the appanage of certain very old tissues of the body, which in lower forms of animal life carry on their activities independently. With advancing complexity in the animal series interrelations become established until with the beginnings of a more developed sensorimotor system vital levels are reached, and a certain degree of correlation is effected. Finally with advancing evolution the pallium commences to take on more and more of the functions of interrelationship. With each advance, from physico-chemical to vital, to psychical, the nervous switch board assumes more and more interrelatory control until in the latest evolution of matter, the human body, all levels of the nervous system are represented and working together.

Heretofore chaos existed in our knowledge of the simplest of the physico-chemical processes, *i. e.*, as to their mutual dependencies and connections one with the other. Biedl's work, here most acceptably translated, offers a solid foundation in this chaos. Without it the studies of Epinger, Hess, Higier, Müller, Falta could not have been made.

It is a work of supreme importance to the neurologist, as it deals with the phylogenetically oldest relations of the nervous system: those in which action and reaction are represented in the same tissues, internal glands and sympathetic nervous system, one and the same.

JELLIFFE.

Notes and News

A meeting of the Philadelphia Neurological Society was held in the hall of the College of Physicians, January 5, 1914, Dr. George E. Price, the president of the Society, in the chair. A committee was appointed consisting of Dr. Charles K. Mills, Dr. F. X. Dercum, and Dr. James Hendrie Lloyd to prepare a minute regarding the death of Dr. S. Weir Mitchell, the first president of the Society. The committee reported the following resolutions which were unanimously adopted.

Resolved, That the Philadelphia Neurological Society has learned with the deepest sorrow of the death of Dr. S. Weir Mitchell. On the organization of the Society in 1884 Dr. Mitchell was elected its first president, an office which he held for three years. His presence and example in the early period of the history of the Society stimulated its work and increased its usefulness. During the thirty years of its existence he contributed from time to time to its proceedings articles embodying original ideas and research. He was to every member of the Society a highly valued adviser, helper, and friend and his loss will be felt by each and all as personal. His name and fame will be cherished by the Philadelphia Neurological Society, not only as its first president, its distinguished member, and valued contributor, but as the foremost figure in American neurology.

Resolved, That these resolutions be spread upon the minutes of the Society and that a copy be sent to the family, to the public press, the JOURNAL OF NERVOUS AND MENTAL DISEASE, the *Journal of the American Medical Association*, and other important medical periodicals.

Remarks relating to Dr. Mitchell's distinguished career and especially his connection with neurology in Philadelphia and in the country at large were made by the president, Dr. George W. Price, and by Doctors Mills, Dercum, Lloyd and Spiller.

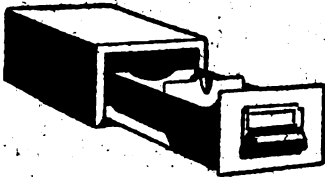
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Vol. 41



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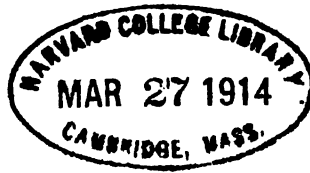
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Original Articles

A CASE OF SUBCORTICAL OR PURE MOTOR APHASIA (DEJERINE) OR ANARTHRIA (MARIE)¹

By F. X. DERCUM, M.D.

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The following case is of unusual interest, because of the light which it throws upon the condition described by Dejerine as "aphasie motrice sous-corticale ou pure" and by Pierre Marie as "anarthrie."

The patient was H. L., age 32, an American of Irish parentage, a machinist and right-handed. He was admitted to the Jefferson Hospital on October 18, 1913. A previous family history or a personal history could not be secured but from the friends accompanying the patient it was learned that on the day before, the patient became suddenly unable to talk and that at the same time he became weak on the entire right side of his body.

An examination revealed a well-nourished man of average physical development. In walking there was a slight dragging of the right leg. There was some weakness of the right arm; the lower half of the right side of the face was paralyzed and the tongue was deflected toward the right; there was also a slight difficulty

¹ Patient presented before the Philadelphia Neurological Society, November 28, 1913.

in swallowing. The patient could not close the right eye quite as well as the left. The reflexes showed no special change with the exception that there was a slight Babinski sign upon the right side. There were no sensory losses.

The patient was utterly unable to talk. He had apparently a complete motor aphasia. He was unable to make the slightest articulate sound. He could grunt and produce various discordant noises but he could not even say the words "yes" or "no" which aphasics usually retain; he could not say his name nor indeed could he be provoked to give vent to oaths or expletives. In Broca's aphasia, as is well known, the patient commonly retains the power of saying yes and no, perhaps of giving his own name or makes use of oaths or other short phrases but in the present instance nothing in the nature of an articulate sound could be elicited; the patient in spite of any effort made by himself was utterly unable to utter a word or even the semblance of a word.

At the same time the patient's understanding of spoken speech and comprehension of what was said to him was perfect. He complied with instructions embodying numerous factors promptly and intelligently. Speech comprehension was perfectly preserved. Further the patient could read written or printed matter and could carry out instructions perfectly. He could not of course read aloud. Again there was not present any agraphia; although the right hand was weak, the patient was perfectly able to handle a lead-pencil. He was quite illiterate, however, and perhaps for this reason did not attempt to communicate his wants in writing but relied solely upon gestures which were very intelligently made and were very readily understood by those about him. He made no efforts at spontaneous writing nor did he seem to be able to answer questions by writing except with difficulty and with numerous errors in spelling, although he always chose the proper words. He could write from dictation, of course, making similar errors, and he could copy written words placed before him. An examination revealed a Wassermann reaction, plus two. He received an intravenous salvarsan injection and sometime subsequently iodides and mercurials.

He remained in the condition of almost total inability to talk for a period of between three and four weeks when he began to utter his name and occasionally other words. The words, how-

ever, were so imperfectly articulated that they could only now and then be understood. Gradually, however, the articulation improved and he can at present be understood, though with difficulty. In other words, there was present at first a complete anarthria—a complete absence of spoken speech which later gave place to a dysarthria.

The symptoms presented by this patient on admission to the hospital were identical with those described by Dejerine as “*aphasie motrice sous-corticale ou pure*.” In this condition motor speech contrary to what is met with in Broca’s aphasia is entirely wanting. The integrity of the interior language is perfectly preserved. The patient understands everything that is said to him, is able to read and to write both spontaneously and at dictation. “The sole phenomenon consists in the impossibility of the articulation of sounds in all their modes but all of the other qualities of language are intact and the interior language functionates as in the normal individual.”²

Finally this condition is identical with that described by Marie as anarthria. By this term Marie does not mean a *dysarthria*, but an absence of articulate speech. Moutier describes the condition as one in which the patient finds it impossible to communicate by spoken speech with his entourage; the tongue does not obey the will; the emission of cries even is difficult. The patient notwithstanding understands every phrase which is exchanged about him or which is addressed to him. The thoughts in his mind are very clear and his words precise but he cannot exteriorize them at all. The newspapers which one hands him and the paper upon which those about him communicate with him in writing, he comprehends perfectly. There is present but one symptom and that is the suppression of articulate language.³

It would appear that in the case before us the patient had had a subcortical syphilitic lesion involving the knee of the internal capsule and probably the adjacent portion of the lenticular nucleus. The paralysis of the arm and leg, let us remember, was relatively slight while the involvement of the lower half of the face was quite pronounced, the tongue also was deflected to the right and there was slight difficulty in swallowing. Surely there was at no time any cortical involvement and the fact which makes

² Dejerine, *Sémiologie du Système Nerveux*, p. 402.

³ Moutier, *L’aphasie de Broca*, p. 179. *Symptômes de l’anarthrie pure*.

the case especially interesting and, so-to-speak, proves its character, is the transition of the anarthria into a dysarthria while the patient was under observation. Is it not giving an improper meaning to the word aphasia to call such a loss of speech a sub-cortical or pure motor *aphasia*? The word aphasia should, it would appear, be limited to cortical, i. e., mental, speech disturbances. The word anarthria seems to be far more suitable for it implies a loss of speech, in part paralytic and in part atactic, but never intellectual.

REMARKS ON THE HISTOPATHOLOGICAL CHANGES IN THE SPINAL CORD DUE TO IMPACT. AN EXPERIMENTAL STUDY¹

BY ALFRED REGINALD ALLEN, M.D.,
OF PHILADELPHIA

In 1911 I presented a preliminary report before the American Neurological Association entitled "Surgery of Experimental Lesion of Spinal Cord Equivalent to Crush Injury of Fracture Dislocation of the Spinal Column."²

I shall briefly recapitulate the essential points in this work because the present report is a continuation of this experimental study.

After laminectomy had been performed on the dog and without opening the dura, there was determined the maximum amount of impact in gram-centimeters to the spinal cord, delivered by a special mechanism, from which the animal would recover with normal motor function, without further operative procedure. Then the amount of impact from which the dog would not recover without operative procedure was determined. The former was termed hypo-impact and the latter, hyper-impact. Any impact up to 340 gram-centimeters was found to be hypo-impact; and anything above this amount was termed hyper-impact.

When an impact of 450 gram-centimeters was used the animal would invariably die, presenting the symptom-complex of complete transverse lesion of the spinal cord unless the operative procedure herein described was followed. This procedure consisted in a median longitudinal incision directly through the injured area of the cord. The physiology of the beneficial action of this means was ascribed to a draining of the cord at this point of blood and serum and thereby not only preventing the pressure

¹ From the Department of Neurology and Neuropathology and the John Herr Musser Department of Research Medicine in the University of Pennsylvania, Philadelphia, Pa. Read before the American Neurological Association, Washington, D. C., May 5, 1913, and at the Seventeenth International Congress of Medicine, London, August 6-12, 1913.

² Journal of the American Medical Association, Sept. 9, 1911, Vol. LVII, pp. 878-880.

of this exudate on the nerve elements but also removing what would in time, through chemical change, give rise to a biochemical irritation with destruction of tissue.

It was pointed out therefore that the question of impact to the spinal cord had two main factors: "(1) the direct injury to the axis cylinders from the impact; (2) the outpouring of serum and blood into the substance of the cord."

Longitudinal incisions through the injured area, not in the median line, but four or five millimeters from the median line and directed centrally, were tried and proved of avail. But theoretically it would seem that the median incision were more free from trauma.

In this presentation I shall discuss (a) the histopathological changes in the spinal cord of the dog from fifteen minutes to six hours after hyper-impact injury; (b) the effect on the histopathological picture of the median longitudinal incision performed two hours after impact, the dogs being killed six hours after impact; (c) consideration of hemolytic change in the extravasated blood in the substance of the cord due to the action of crushed myelin; (d) three cases of median longitudinal incision after fracture dislocation of the spinal column in the human subject.

The spinal cord of the dog, fifteen minutes after an impact of 540 gram-centimeters (ninety gram-centimeters more than is necessary to cause an eventual death if not operated on), presents three points of interest. There is, as can be seen in the photo-micrograph, a dense packing of erythrocytes in the pia-arachnoid, most conspicuous on the anterior aspect of the cord. These erythrocytes appear to force themselves into every available cleft and in some places, particularly in the neighborhood of the posterior roots, there seems to be actual continuity between this annular zone of erythrocytes and miliary hemorrhagic conditions in or near the tip of the posterior horn of gray matter. Secondly, there can be seen isolated hemorrhagic foci, usually exceedingly minute and with a predilection to the posterior horns or posterior columns. At times in these fifteen minute specimens the amount of hemorrhage is somewhat greater, but when this is so the bulk of it is confined to the gray matter and apt to be near the central canal. Thirdly, even at this early time there is unmistakably a beginning edematous condition, especially

noticeable in the white matter. At first I thought this edematous appearance might be due to a faulty histological technique and I therefore repeated some of this work using several techniques, but I found the same condition of affairs.

One hour after the impact there seems to have been some dissipation in the annular zone of erythrocytes although these are still quite numerous. The most essential change is that the intramedullary hemorrhage has now assumed a much greater proportion. The gray matter is particularly affected in this

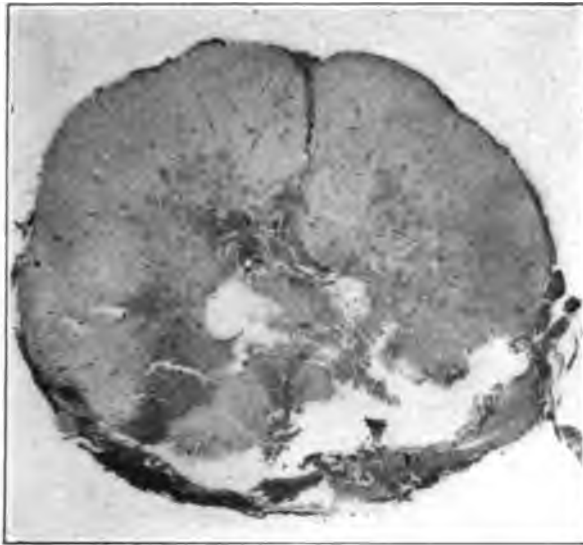


FIG. 1. Cross section of spinal cord six hours after the hyper-impact of 540 gram-centimeters. In this case there was no median longitudinal incision through the injured area. The loss of cord substance is due to the extremely disintegrated condition of the tissue.

hemorrhagic condition; and at times there seems to be a dense groundwork of erythrocytes in a large part of the gray substance. Likewise hemorrhages have by this time occurred in the white matter of the posterior and lateral columns and it is an ordinary thing to find places where the walls of the centripetal blood system have been ruptured with a consequent outpouring of erythrocytes. At this time is also noticed a deterioration in the staining characteristics of the anterior cornual cells, a change which is very marked three hours after the impact. Of course this refers only to the centimeter of cord struck.

Two hours after impact the hemorrhagic areas are conspicuous in gray and white matter, especially the former. There now seems to be but little of the gray matter not infested with erythrocytes and in places this hemorrhage has become hyaline in appearance, showing at the edges of the hyaline areas washed-out ghosts of corpuscles. The edematous condition of the white matter is now quite extreme.



FIG. 2. Cross section of spinal cord six hours after the hyper-impact of 540 gram-centimeters. In this case the operation of median longitudinal incision was performed two hours after the impact. The section shows the blood pouring out of the cord substance posteriorly, into the subdural space. The excellent preservation of the cord substance is quite obvious.

By four hours there has been added one change which surprised me extremely. We find numerous swollen axis-cylinders in the white matter of the lateral and posterior columns. Whether to ascribe this to the first factor (the direct injury to the axis-cylinders from the impact) or to the second (bio-chemical effect of the outpouring of serum and blood into the substance of the cord) I do not feel able to say. But very certain it is that at this stage the swelling of axis-cylinders has commenced.

The fifth and sixth hours after the impact add nothing new to the picture. There is simply an exaggeration of what has already been described above. By the sixth hour there is the very evi-

dent disruption of cord substance pictured in the photomicrograph.

I now turn to the subject of median longitudinal section of the cord through the injured area two hours after the 540 gram-centimeter impact. The dog is allowed to live for four hours after this section or six hours after the impact. If the photomicrograph of the cord subjected to the above hyper-impact and removed six hours after injury (*without* the median longitudinal incision) be compared with the picture of the cord having had this operative procedure two hours after the impact and then removed six hours after the impact, the rationale of this means of treatment at once becomes apparent. There is a great outpouring of blood from the injured area posteriorly through the incision as can be seen in the picture. And the most important thing to which I wish to call your attention is the much better state of preservation of the substance of the cord in this sectioned case. We have here decompressed the cord substance.

Noticing the glassy-like appearance of some of the hemorrhagic areas I wondered whether this might be an hemolysis due to the action of injured myeline on the erythrocytes. I therefore made sterile emulsions of dog's spinal cords and tried in vitro to produce hemolysis in whole and defibrinated blood. In this I conspicuously failed. I was the more surprised because most careful examination of these hyaline-like areas under high magnification failed to resolve a granularity.

I shall now briefly note three cases of fracture dislocation of the spinal cord in the human subject in which the median longitudinal incision was used.

The first case was a man fifty years of age who had fallen thirty feet off a scaffolding, landing on his back and head. There was bleeding from the nose and ears as well as complete motor paralysis and anesthesia for all forms of sensation of the lower limbs. The line of anesthesia extended upward to about five centimeters above the umbilicus. The Roentgen ray discovered a lateral displacement of the sixth on the seventh thoracic vertebra. The diagnosis of fracture dislocation of the spinal column complicated by fracture of the base of the skull was subsequently confirmed at necropsy. I saw this patient ten hours after the injury by which time the limit of anesthesia had ascended about fifteen centimeters and his condition was des-

perate. It was decided to perform laminectomy and view the cord. This was done by Dr. Joseph Spellisy and the cord was found a darker color than normal though of fair contour. The median longitudinal incision was made and there was discharged at once from the cord wound considerable blood.

The next day the limit of anesthesia had begun to fall and in forty-eight hours had fallen to the original level. Unfortunately the cranial condition began to give trouble about five days after the injury and ten days after the accident he died. Dr. Spellisy most kindly gave me the pathological material of this case.

The second case was a large, well-developed negro of about forty years of age who had been struck just below the vertebra prominens by the end of the pole of a rapidly moving wagon. There was a transverse lesion of the first thoracic segment of the cord presenting the symptom-complex of complete solution of continuity. The area of anesthesia ascending slowly and the conditions justifying exploratory laminectomy, Dr. Edward Martin operated about seven hours after the injury.

The course of this case subsequent to operation gave us every reason to hope for a favorable termination. In two days the limit of anesthesia had fallen to the original level and in four days there was a moderate return of deep pressure sense and sense of position *in the lower extremities*. From the first there were indications that only most careful nursing would prevent the formation of bed-sores. His general condition became progressively better and all signs were favorable when, ten days after the operation, his wife insisted on taking him home. He died several days after, his entire sacral region being the site of an enormous bed-sore.

The third case was one of fracture dislocation in the upper thoracic region in a young boy of about seventeen years. Dr. Charles H. Frazier operated four hours after the injury. I learned from Dr. Frazier that when the cord was incised the blood spurted out as if under great pressure. It is now over a year since this patient was operated upon. I have heard that function though not restored is improving gradually.

In conclusion I would say that I feel that this work is still in the experimental stage and that the median longitudinal incision of the spinal cord in cases of fracture dislocation of the spinal column has yet to prove its position as an advisable procedure in

surgery. There are two points which I would accentuate. The first is that it seems as though it would be necessary in order to have this method effective to operate within a very few hours of the injury. This is without doubt a great limitation. Secondly, one will always be able to say that possibly a given case would have recovered if left alone; or that the semisuccessful outcome of the operated case is possibly owing to additional trauma to the cord at the operation, and that if the expectant treatment had been followed the results had been better. Of course this latter argument can be used with just as much force in the opposite direction. But let us right here remember that the usual course of the broken back is death after much suffering and that in the few cases that live after the expectant treatment in the vast majority the last state of that man is worse than the first.

The results from the experiments on the dog are most encouraging and this encouragement is more than sustained by the few observations in the three human cases.

A CASE OF DYSTONIA MUSCULORUM DEFORMANS

BY C. C. BELING, M.D.

P. F. Female. Born December 10, 1897, in New York City, of Hebrew parents, both natives of the town of Vilna, Russia.

Family History.—The family history is good. The parents are both living and well. Patient has two brothers and four sisters who are in normal health. Two children, twins, died soon after birth. At ten years of age a maternal cousin developed hemiplegia, following typhoid fever.

Personal History.—Patient was born at full term, developed normally and was considered the brightest and healthiest in the family. It was noticed by the parents that at about 7 years of age she was constantly placing the right foot upon the left, and that soon after the right foot began to turn inwards.

In December, 1904, a week before this peculiar condition was first observed she is said to have been confined to her bed and the house with a fever and sore throat for a couple of days, after which she resumed attendance at school. At this time she was seen by a physician, who said that the ankle was out of place and the foot should be put up in plaster. Four weeks later after the plaster cast was removed, the right foot and lower extremity showed a greater degree of torsion. She placed the outer side of the foot on the ground in walking and standing. The gait was also peculiar. The entire right lower extremity gradually twisted inwards and was carried backwards. Two years later the left lower extremity was gradually affected, the thigh was strongly flexed upon the abdomen and the leg upon the thigh; the foot was extended and turned inwards.

About six or seven years ago she spent varying periods in different hospitals in New York, but her condition did not improve at all.

Four years ago she was put up in plaster in an Orthopedic Hospital in Newark. The plaster cast was applied to the trunk and lower extremities and kept on for a period of three months. On its removal she had abrasions and ulcerations on her back and around the knee joints. No improvement resulted. Soon after she was discharged from this hospital deformity of the spine was noticed. The body began to turn and twist. Twitching jerking movements were marked in the lower extremities. These movements extended to the body and the right arm. Finally the left arm and the neck were also affected. The face was never involved.

In 1908 the parents took her to Sharon Springs for a course

of sulphur baths. During this period she was able to sit up and take her food, using her hands well.

In June, 1909, she was treated at the Newark City Hospital for a period of three weeks. A diagnosis of bilateral athetosis was made at this time. The electrical reactions showed no degenerative characteristics. The patient was examined and X-Ray pictures taken under anesthesia. I regret that the notes then



FIG. 1. Roentgenograms (taken by C. F. Baker, M.D.). Showing slight tilting of pelvis with deformity of neck and upper end of shaft of left femur, with inward rotation.

made at the hospital are unavailable. The radiograms show very well the extent and character of the deformities: the skoliosis, the bony displacement and the torsion of the femur.

PRESENT CONDITION

Attitude. Sitting.—Patient sits in a peculiar bunched-up contorted position, the neck is thrown back, the left elbow joint is strongly flexed and used as a point d'appui, the left wrist is hyperextended, the forearm is in semi-pronation, the hand is used as a support for the head, the fingers are strongly flexed upon the thumb.

The right upper extremity; the forearm is in semipronation.

but not to such a degree as the left, the pronator teres and flexors being mostly contracted. She grasps any convenient object with the right hand to further steady herself.

The right lower extremity is flexed at the knee and slightly rotated outwards at the hip; the leg is carried backward until the foot touches the left side of the pelvis.

The left thigh is extended; the knee slightly flexed, the foot in hyperextension and the toes markedly flexed. The right gluteal region is very prominent. Lordosis is hardly present; skoliosis is very marked; the curve is directed toward the left in the dorsal region, the body is strongly flexed upon the lower extremities.

By supporting her left elbow upon the sofa and placing the left hand upon the chin she is able to obtain some rest for a few minutes.

In sitting the lordosis disappears, but the kypho-skoliosis persists presenting a deformity which suggests a camel's hump.

Movements.—In the sitting posture, when patient is at complete rest the movements are very slight at times, while at other times they are more marked. These movements are of a tonic and clonic character. They affect all the extremities, the neck and the body, but the face is free. During the last six months the movements have improved a great deal. They are generally less all over the body, especially in the legs. The right upper extremity has improved to such an extent that she is now able to draw somewhat.

The characteristic feature of the case is the extreme tonic spasm, which persists almost continuously, but varies greatly in intensity. As a result of this spasm very severe distortion of the extremities, neck and trunk have taken place. With this tonic spasm, there are to be noted clonic movements and movements of a jerky character, at times resembling those of chorea and at other times like those of tic. Added to all these voluntary movements complicate the picture.

There is a certain conflict between the voluntary movements and the tonic spasms, which may be noted in the bizarre useless motions that are gone through when the patient attempts to execute any ordinary command. Frequently it is only after much effort that she is able to accomplish the desired act.

The tonic spasms are most marked when the patient attempts to stand or walk. During sleep all movements cease.

She is able to walk only one or two steps without any assistance, but with slight assistance, for example, touching the furniture, she is able to go from one room to another. The gait is bizarre and suggests the walk of a dromedary.

The limbs on the left side are most affected. Abduction of the left foot is impossible, but extension and flexion of the toes is preserved.

Except for the characteristic positions of the upper extremities the movements in them practically cease, when the patient is at rest in bed. The tonic spasmodic movements in the lower extremity still persist, and clonic components are most marked in the left leg. There is a hypertonia in the legs, especially in the calf muscles and anterior groups, but the muscles can be distinctly palpated under the skin. The left foot is in the equinus position, the right exhibits a talipes equino-varus.



FIG. 2. Marked scoliosis of dorsal spine—approximation of ribs on right and separation on left.

At rest the inner hamstring muscles of the left thigh are mostly in strong tonic contraction. This is replaced from time to time by a short tonic contraction of the quadriceps group.

In sitting the lordosis disappears, but the kypho-scoliosis persists.

She is able to rise well from the dorsal position. The right upper extremity is at present the least affected. One occasionally sees jerky movements in it. It is quietest in a semipronate position.

In the prone position the lordosis is increased, especially when the muscles of the back are thrown into spasm, but the skoliosis is not so prominent.

Movements are all present in the ankles although much restricted.

Reflexes.—The knee jerks are present on both sides and are obtainable without reinforcement. The plantar reflexes are flexor in type. Achilles reflexes are obtainable at times. The right Achilles tendon reflex is only weakly present, the left is more active. Both are apparently diminished.

MEASUREMENTS

	R.	L.
Upper arm	8½ in.	8½ in.
Forearm	8¼ in.	8 in.
Wrist	6½ in.	6½ in.
Thigh	12½ in.	12¼ in.
Calf	8 in.	8 in.
Ankle	5½ in.	5½ to 6 in.



FIG. 3. Lateral view of ankle, showing displacement of tarsal bones due to talipes equino-varus.

The measurements do not show any marked difference. They are not as accurate as they may be, owing to the difficulty of measuring due to the constant movements of the limbs.

The cranial nerves are normal, no cerebellar disturbances. No sensory disturbances. Speech is normal. The breasts are well developed. No thyroid enlargement. The thoracic and abdominal organs show no gross lesions apart from their displacement due to the excursions of the torso.

Wassermann test is negative. The blood examination shows a secondary anemia of the chlorotic type.

REMARKS

The history of this case shows that an insidious disease appeared in a hitherto normal girl of 7 years of age, of Russian Hebrew parentage, without any hereditary degeneracy.

Its chief feature consisted in the appearance of a progressive generalized muscular spasm of a tractile and torsion-like character.

The disease began in the right foot and exhibited itself as a disturbance of gait in which hypertonia and spasmodic components were evident. These spasms produced peculiar deformities in the trunk and extremities.

The movements were almost always slow, rather stereotyped and not so graceful and rhythmic as those of bilateral athetosis. Occasionally jerky muscular contractions were observed. The muscular spasms were not under the influence of the will.

In the early stages voluntary movements were not seriously disturbed, but at the present they are very strongly interfered with.

Complicated motor acts, such as rising, walking, eating, etc., have been profoundly affected.

There has been no diminution in the power of the muscles, except for those produced by the contractures.

The movements cease during sleep.

The spasmodic of the right upper extremity has shown a slight degree of regression.

The intellect has been entirely unaffected. The emotional state has been normal. Neither suggestion nor hypnosis has had any influence. There have been no hysterical stigmata.

The disease shows a marked similarity to bilateral athetosis, chronic chorea and degenerative tic.

The characteristic participation of the facial muscles, the peculiar grimacing, noted by Lewandowsky, the combination with it of signs of spastic diplegia, which is a frequently associated phenomenon, the enormous influence of emotional processes, seen in bilateral athetosis, are lacking in our patient.

THE ALBUMEN CONTENT OF THE SPINAL FLUID IN ITS RELATION TO DISEASE SYNDROMES¹

BY A. MYERSON, M.D.

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The routine examination of the spinal fluid as it is followed in the European and American clinics is an effort to determine the presence or absence of globulin in clinically appreciable quantities, of an increase in the cellular content, and the Wassermann reaction. A fluid negative to all these tests is declared negative, i. e., normal. It is the purpose of this paper to establish the fact that the presence or absence of an *increase* in the normal albumen content is an essential part of a spinal fluid examination and moreover that this constituent, or rather group of constituents, plays a rôle in the pathology of the nervous system of a peculiar and important character.

In the first large book devoted to the chemistry of the cerebro-spinal fluid, Mestrezat² gives an account of the history of the researches along this line as well as his own experience. He has found that the albumen content when increased always denotes organic disease. He gives an interesting and important account of the various disease syndromes in which this group of constituents is increased, and in particular lays stress upon the meningeal affections. He likewise speaks of the increase found in the syphilogenous diseases, general paresis, tabes, but here, like all the authors, his attention is directed mainly to the globulin increase. An important finding of Mestrezat's, but which he dismisses rather carelessly, is the increase of albumen found in "chronic alcoholism" (a very indefinite term), lead poisoning, etc. With his findings, as far as I have gone, I thoroughly agree, and I have to add some observations which my experience leads me to believe are of fundamental clinical importance.

¹ Read before Boston Society of Psychiatry and Neurology, November 20, 1913. Being contributions of the Psychopathic Hospital, Boston, Mass., 1914. Taunton State Hospital papers, 1914, I.

² W. Metrezat, *Le Liquide Céphalo Rachidien*, Paris, Maloine, 1912, p. 223, etc.

For a year I have included in my routine examination of spinal fluid, a clinically quantitative estimation of albumen. Into a narrow test tube, one with a bore of about 6 mm., 2 c.c. of spinal fluid measured by a graduated pipette is dropped. The fluid is heated short of the boiling point and then 6 drops of a $33\frac{1}{3}$ per

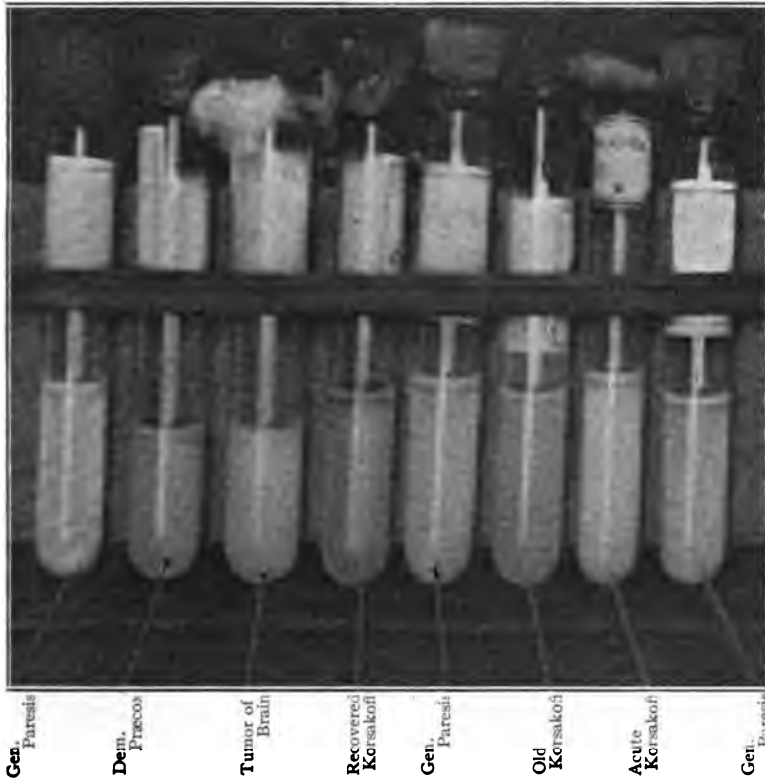


FIG. 1. Illustrates the appearance of the spinal fluid immediately after the test. The degree of cloudiness or opalescence is shown. The difference between the normal, for example, that entitled dementia præcox, and the abnormal, designated as general paresis, etc., is well shown.

cent. aqueous solution of trichloroacetic acid is dropped into the warm liquid (Mestrezat). In the normal fluid there is at once a diffuse but not marked cloudiness which gradually settles in thirty minutes or thereabouts into a flocculent precipitate just covering the bottom of the tube. Where there is distinct increase there is a dense cloud which almost immediately becomes flocculent and

settles to a height of perhaps .5 cm., from the bottom of the tube. A very short experience is sufficient to enable one to recognize the difference between the normal amount and any decided increase (Figs. 1 and 2). If, then, the same sized tubes are used with the same quantities of the reagents, a permanent record can be kept by simply sealing the tubes and storing them away. While this method is not chemically accurate, it suffices for present clinical purposes.

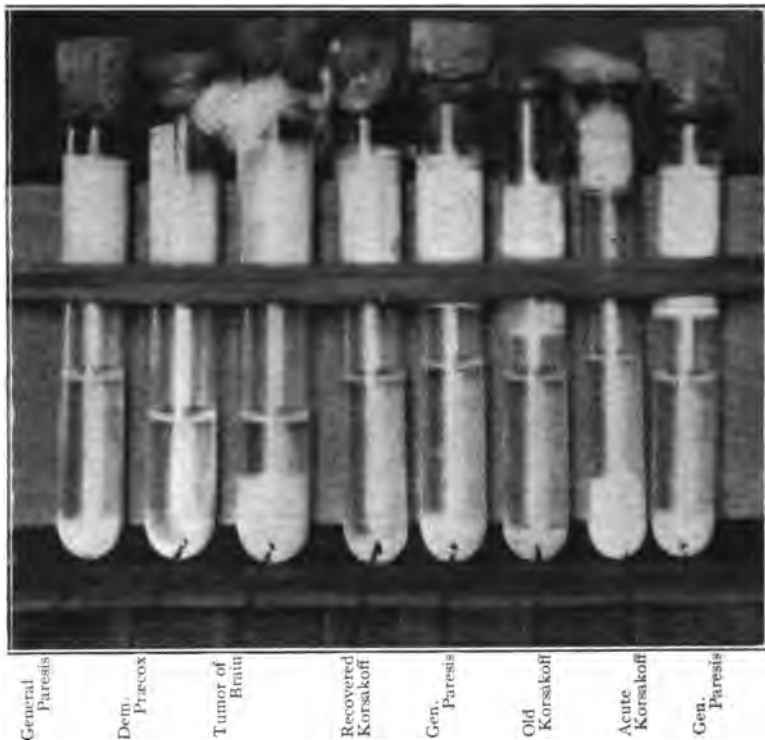


FIG. 2. The same tubes and fluids one hour later. The precipitate has settled and the differences are well shown.

The following statements cover the results of my investigation. One hundred cases of general paresis have had their spinal fluids examined for Wassermann reaction, cell count, globulin and albumen. Eight cases of general paresis have been treated by the Swift-Ellis intradural treatment for periods ranging from two to eight months, and in some cases as many as ten lumbar punc-

tures have been performed, and an examination of the spinal fluid has been instituted each time. Six cases of Korsakoff's disease, two cases of brain tumor, and over one hundred miscellaneous conditions (dementia præcox, manic depressive, cerebral organic disease, etc.) have been studied. The patients were examined either at the Psychopathic Department, Boston State Hospital, or at the Taunton State Hospital, and I hereby thank the authorities of these hospitals for their kindly assistance.

1. *Incidence of albumen* as compared with other findings in general paresis, with special reference to fluctuations in treated cases.

It may be stated without reserve that there is always a very marked increase of albumen in general paresis. This increase is three or four times the normal amount. This increase parallels the globulin increase as follows:

If the globulin content be expressed in terms of 1 +, 2 +, or 3 +, then the albumen can usually be expressed in the same proportion, 1 +, 2 +, or 3 +. Usually, too, an increased cell count goes with a large amount of albumen but *not so constantly* as the globulin increase. The intensity of Wassermann reaction seems to bear about the same relationship to the albumen increase as does the cell count.

In the cases treated by Dr. R. R. Rupp and myself² by the Swift Ellis salvarsanized serum method, the following points are important.

(a) The Wassermann reaction is the first reaction to disappear and is the most variable.

(b) The cell count increase approaches closely to the Wassermann reaction in variability. This, however, may be due in part to the technical difficulties of accurate cell counts, but is certainly not altogether due to this difficulty.

(c) The globulin content varies to a less extent than either the Wassermann reaction or the cell count.

(d) The albumen content varies least of all.

That is to say that the variations occurring during treatment (either because of it or coincidently) show that albumen increase is a more constant sign of the paretic process than any of the other signs, and has a certain independence of their occurrence. Moreover, in two untreated cases, where general paresis

² Myers, Boston Med. and Surg. Journal, Sept. 18, 1913.

was suspected, and the first spinal fluid specimen gave a negative Wassermann reaction, while the second gave a positive, the albumen content was practically the same in each specimen.

2. In one case of cerebro-spinal syphilis (Psychopathic Hospital, case No. 11823) with facial palsy, ophthalmoplegia externa, etc., following the initial lesion by three months, treatment finally brought about a negative Wassermann reaction, a normal cell count, a very slight globulin increase and a decided improvement clinically, but the albumen increase was *marked* even upon discharge. The significance of this to me is that the man was not cured.

3. In Korsakoff's disease (six cases). This disease throws into striking relief the significance of the total protein increase as evidenced by the test under question. To cite a couple of cases will perhaps be the simplest way of bringing out the point to be emphasized.

Case No. 12009, Psychopathic Hospital, showed on entrance multiple neuritis, external ophthalmoplegia, amyosis to blue light, confabulation, recent memory defect, etc. Wassermann reaction in blood and spinal fluid negative, no globulin, no increase in cell count, *albumen distinctly increased*. Repeated punctures over a period of four months have shown the same findings, except that the albumen content is now less marked (Fig. 3).

Case No. 12038, Psychopathic Hospital (kindness of Dr. Cook), showed on entrance clinical signs of Korsakoff's disease. Spinal fluid showed no cell increase, negative Wassermann reaction, no globulin, but a marked albumen increase. On discharge to another hospital, with clinical symptoms showing only the mild dementia of old Korsakoff's disease, there was only a slight increase, if any, of the albumen content. That is to say, the restitution brought about, or was accompanied by, a reduction of the albumen to the normal.

The next two cases tend to show that the neuritic symptoms bear less relation to the albumen content than do the mental symptoms.

Case No. 19562, Taunton State Hospital, is a man whose disease is of two years standing. There never have been neuritic symptoms but there is a decided history of alcoholism, a marked memory loss, and a delusional state of mild character. No signs of organic disease. Wassermann reaction in blood and spinal

fluid negative. Eyegrounds normal. At present no cells in spinal fluid, very slight globulin increase, distinct albumen increase (Fig. 3).

Case No. 20266, Taunton State Hospital, a woman whose disease of one year's duration. At onset hallucinations of sight and hearing and restlessness. Later, confabulation, memory loss, and multiple neuritis. At present no confabulation, good insight, but a mild dementia and distinct multiple neuritis (absent re-



FIG. 3. These tubes are from one case of Korsakoff's disease and from left to right the specimens pass from earlier to later. The first specimen is shown in Fig. 1 as "Recent Korsakoff."

flexes, atrophy, foot drop, etc.). Wassermann reaction in spinal fluid negative; globulin 0; no cells. *Albumen, very slight, if any increase.* Wassermann reaction in blood positive but the clinical signs and symptoms preclude nervous syphilis and indicate that the syphilitic infection was only incidental.

The first of these two cases has marked mental symptoms and no neuritis, shows albumen increase; the second with reverse symptoms shows no decided increase. The conclusion, which, of course, needs more cases to substantiate it, points toward the increase as due to the brain change.

Two cases of tumor of the brain, one of which was a gumma, showed interesting spinal fluid findings, particularly in relation to albumen.

Case No. 1449, Psychopathic Hospital, had choked disk, convulsions, aphasia, and focalized dullness and tenderness over right parietal region. Wassermann reaction in blood serum, first examination was negative; second positive; spinal fluid, negative to Wassermann reaction, globulin very slight, 6 cells, marked albumen increase. Operation by Dr. Harvey Cushing revealed inoperable gumma.

Case No. 20782, Taunton State Hospital, having as evidence of tumor Jacksonian epilepsy of left hand and arm, occasional grand mal, inability to stand or walk, exaggerated reflexes, with Babinski's phenomenon on left, markedly choked disks, gave the following findings—Wassermann reaction in blood and spinal fluid negative on two occasions. In the spinal fluid, globulin very slight, 70 cells, and the heaviest precipitation of albumen that I have seen in any case (Figs 1 and 2).

At the present time I am not prepared to discuss the findings in other diseases. Dr. Cook of the Psychopathic Hospital has reported to me that in a case of cyst of the brain, so diagnosed because of the focalized symptoms with history of hemorrhage and no symptoms of pressure, he has found decided increase in albumen, very slight increase in globulin and 6 cells. Wassermann reaction negative in blood and spinal fluid. My own experience with cerebral hemorrhage and allied conditions is not of a nature to permit definite statements except that I have seen cases with moderate increase in albumen and no other pathological findings.

Looking over the facts as above detailed, the following general conclusions present themselves.

1. That in the full fledged general paresis, the relationship of albumen, globulin, cells and Wassermann is quite constantly one of parallelism but that in the remissions the Wassermann reaction disappears first, the cell count and globulin increase diminish next.

and the albumen most constantly remains at a high level of increase. This points toward a conclusion which is merely a forward deduction—namely, that in the pre-paretic stage the albumen increase is probably the first sign of disease.

(a) In Korsakoff's disease, in certain cases of tumor, and in other organic diseases there is a dissociation of albumen and globulin in this sense, that there is either marked increase of albumen without globulin or that a marked increase of albumen, say 3 +, is accompanied by a globulin increase of, say, only 1 +.

(b) These two series of facts lead to the further conclusion, that the increase of albumen is a primitive reaction of the nervous system and is the first as well as the most constant of the present known chemical and biological changes to appear in the spinal fluid. Tests to ascertain its presence should be part of the routine spinal fluid examination and its exact measurement and significance constitute a task worthy of neurological research.

CONTRALATERAL PERIOSTEAL REFLEXES OF THE ARM¹

BY A. MYERSON, M.D.

CLINICAL DIRECTOR AND PATHOLOGIST, TAUNTON STATE HOSPITAL, TAUNTON, MASS., FELLOW IN PSYCHIATRY, HARVARD UNIVERSITY

Contralateral periosteal and tendon reflexes of the lower extremity form the theme of a moderately copious literature whose value has not yet been reached.

In describing a contralateral arm reflex, I am impelled first by the fact that this type of response has not hitherto been mentioned, and second by the belief that we need, for the future refinement of diagnosis, to know as much as possible about those nervous responses which are *abnormal* without being definitely *pathological*.

Technique.—With the patient lying flat on his back and his arms at his sides in an easy, relaxed attitude,—usually with slight flexion at elbow and moderate internal rotation—the examiner taps the middle of the clavicle with a reflex hammer. When present, the response elicited is a contraction of the biceps and pectoralis major of the other arm. Usually when the contralateral response is elicited, there is at the same time a homolateral response of the corresponding muscles, but on several occasions in my experience, the contralateral response only has been present.

Roughly speaking, this contralateral arm response is elicited only with hyperactivity of the arm reflexes generally. Nevertheless, certain cases giving very lively homolateral reflexes from the percussion of the ordinary points (radialstyloid, humerus, ulnarstyloid) have failed to give the contralateral response from the clavicle. At the same time the cases giving only moderately increased arm responses have shown very lively contralateral clavicular response.

Incidence in Disease.—This is mostly in such organic diseases whose effect is to increase reflexes, notably general paresis, hemi-

¹ Being contributions of the Psychopathic Hospital, Boston, Mass., 1914. Taunton State Hospital papers, 1914, II.

plegia, multiple sclerosis, tumor of the brain and meningitis. It may be stated that the response is present in only a minority of patients presenting these diseases, and usually in such cases the other responses are very active.

It is present, occasionally only, in certain abnormal mental conditions not at present understood to be organic. In a few cases of dementia præcox, manic depressive insanity and hysteria, the response was elicitable, despite the fact that organic disease could be ruled out chemically by negative Wassermann in serum, by negative Wassermann, cell count, globulin and albumen in spinal fluid, by the absence of kidney changes, and by negative fundus examination. In such cases the emotional content was usually of an intense kind, either of fear or anxiety. The response is absent under normal conditions. It may, therefore, be stated that its presence indicates an abnormal condition, not necessarily one associated with organic disease, although this is the more usual association.

A PROPOS OF THE CONTRALATERAL OPPENHEIM AND GORDON REFLEXES

BY ALFRED GORDON, M.D.

The contralateral Oppenheim and Gordon reflexes to which Dr. A. Myerson of Harvard calls attention in the September, 1913, issue of the JOURNAL OF NERVOUS AND MENTAL DISEASE, is a phenomenon which I had the opportunity to observe in a large number of cases. Speaking particularly of the latter, I found it present in cases of hemiplegia, in gradually developing spastic paraplegia of the aged, in syphilitic myelitis, in cases in which other symptoms pointed to an involvement of the motor tract. It was also observed by me in cases *without* spasticity, exaggerated patellar tendon reflexes, ankle-clonus or Babinski, cases in which subsequent events proved that the motor tract was actually involved. I found it present also in cases of meningitis with unilateral symptoms, such as convulsive seizures or paretic condition of the extremities with the disappearance of which the contralateral phenomenon disappeared. It was observed by me in cases which were suspicious of cerebellar diseases which subsequently proved to be correct and in which the motor tract became involved through compression. In syphilitic involvement of the central nervous system this phenomenon was seen by me most frequently, but its disappearance has also been witnessed by me when considerable improvement was obtained in the other symptoms of the malady. The reflex was observed by me when Babinski was present on the contralateral side and much more frequently when Babinski was absent. But in the latter case when the disease made progress, Babinski invariably made its appearance and the contralateral Gordon disappeared.

The remark which I made in my previous publications on the homolateral paradoxical reflex, namely that the sign in question is an indication of an early and slight involvement of the pyramidal tract, appears to me to have the same value in its contralateral manifestation.

As to the pathogenesis of the manifestation, Dr. Myerson has well said that no thoroughly satisfactory explanation can be

offered. An irritation of the uncrossed pyramidal fibers—appeals to me to be the most plausible explanation of the contralateral phenomenon. Dr. Myerson deserves due credit for calling special attention to the clinical significance of the contralateral Oppenheim and Gordon toe phenomenon.

Translations

VAGOTONIA¹

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER, AND DR. LEO HESS
OF VIENNA

TRANSLATED BY WALTER MAX KRAUS, A.B., M.D., AND
SMITH ELY JELLIFFE, M.D.

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INTRODUCTION

It is often unsatisfactory for the physician, when diagnosing a disease dependent upon long standing disturbance of internal organs, to find that he must be content to make a diagnosis of a "Neurosis." The symptomatology and the impossibility of establishing any anatomical basis for the disease always remain the most conspicuous points in formulating the diagnosis of a neurosis of an internal organ. It is true that one would be inclined to correlate these disturbances with nerve abnormalities

¹ Sammlung klinischer Abhandlungen über Pathologie und Therapie der Stoffwechsel und Ernährungstörungen-Herausgegeben von Prof. Dr. Carl von Noorden. Heft 9 u. 10. August Hirschwald, Berlin.

were it possible to form any clear picture of the significance of the nerves either in the normal progress of the functions of organs or in pathological conditions, but when one considers how difficult under such circumstances it is to give a clear definition of the conception of "a nervous disease of an internal organ" one can only recall the truth of the saying that where a conception is found lacking a clue will appear at the right time. If an attempt be made to substitute a precise conception for obscure ideas, special care must be taken to construct such a concept upon a foundation of facts.

Instead of simply making use of the general expression "nervous," which so frequently means nothing more than the expression of a soothing statement, either to the patient or to the physician, we must attempt, where we can, to separate definite disease pictures according to an etiological point of view. Just as we may analyse with precision the diseases of the cerebro-spinal nerves, in the light of anatomical and physiological knowledge, so, when diagnosing diseases of the nerves which supply internal organs, we must attempt to direct our thoughts along anatomical and physiological channels. Above all, if one really wishes to make further progress, it is necessary to review the physiological facts with thoroughness. It is through an exact knowledge of physiology that one may justly introduce pathology and apply it to the analysis of disease.

2. THE VEGETATIVE NERVOUS SYSTEM AND ITS RELATION TO DRUGS

In contrast to the "Animal" (sensori-motor) nervous system which serves the senses and the muscles controlled by the will, we include under the term "Vegetative" nervous system all those nerve fibers which go to organs having smooth muscles, such as the intestines, blood vessels, gland ducts and skin, as well as the nerve structures which exert a secretory influence upon glands. Besides these organs, there are to be included certain cross-striated muscles: as the heart, the beginning and end of the alimentary canal, and the muscles of the genital apparatus. With the exception of the heart, all of these muscles are functionally very similar to smooth muscles.

The vegetative nervous system cannot be readily distinguished

from the sensori-motor nervous system, because their nuclei lie close to one another both in the brain and spinal cord, and because their fibers have many anastomoses with each other. The principal difference lies in the peripheral make-up of the two systems. The nerves of the sensori-motor system have but one neurone between the nerve centers and the cross-striated muscles, whereas the nerves which go from the spinal axis to involuntary organs of vegetative nature have ganglion cells interposed in their course. Since both afferent and efferent fibers are interrupted, the path from the central nervous system to its organ may be divided into preganglionic and postganglionic segments. The ganglionic interruptions vary in their location. In some cases they are in the sympathetic cord, in some on the path from this cord to the periphery, as, for example, in the celiac ganglion; in some at the periphery itself, as in the case of the heart and intestines. Langley divides these ganglia, on topographic grounds, into ganglia of the first, second and third order.

The uniformity of the anatomic arrangement of the vegetative system foreshadows a uniform pharmacologic reaction, and it is this pharmacologic uniformity which has made possible the separation of the vegetative from the sensori-motor nervous system. If vegetative nerves are stimulated peripheral to their origin in the central gray of the cord, definite manifestations are obtained. These may be eliminated at once if nicotine is painted upon the ganglion between the site of stimulation and the periphery. The functional manifestations of the activity of the sensori-motor nerves are on the contrary unaffected by nicotine.

The vegetative nervous system may be divided anatomically as well as functionally. The system of fibers which arises from the middle part of the thoracic cord and from the upper part of the lumbar cord forms an anatomical entity, which ramifying distally makes up the sympathetic cord. Distal to this it is scarcely possible to distinguish the sympathetic fibers anatomically, since they pass to their substations commingled with other nerve fibers.

A second anatomical grouping is characterized by the fact that its fibers arise in part from the brain and medulla, in part from the sacral part of the spinal cord, and furthermore by the fact that they do not come into any relation with the sympathetic cord. From the view point of gross anatomy this system may be

further divided into three parts: [a] Midbrain, [b] Bulbar, [c] Sacral.

The nerve plexus from the midbrain segments finds egress, in the main, by way of the oculomotor nerve pathways. Its fibers are interrupted in the ciliary ganglia and subserve certain definite functions of the eye. The nerves from the bulbar segments proceed by way of the facial and glossopharyngeal nerves to supply fibers to the glands and vasodilators of the head. The largest and most important branch of this segment is the vagus, the principal nerve of the viscera. It supplies the heart, bronchi, esophagus, stomach, intestine and pancreas. The nerves from the sacral segment are contained in the Pelvic nerve. This supplies the descending colon, the sigmoid, anus, bladder, and genital apparatus.

From this classification it may be seen that all of the vegetative organs are supplied not only by the nervous network which passes through the sympathetic cord, but also by nerve fibers which come from the other system. An exception to this rule is found in the sweat glands, pilomotor muscles, and vascular muscles of the viscera. These, as far as can be discovered anatomically, are only supplied by fibers from the sympathetic cord.

For brevity's sake, it is customary to speak of all nerves which arise from the sympathetic cord as "*sympathetic*," while all other vegetative nerves of the nervous system are spoken of as "*autonomic*" [the system of the "extended vagus"].

Electrical investigations have already shown that in many organs the manifestations caused by stimulation of the fibers of one system may be abolished when one stimulates the fibers of the other.

These reactions show that many physiological antagonists may be demonstrated in the two systems. But the fact that the different nerves of the two systems may be commingled on their way to their end-organs makes anatomical differentiation impossible and physiological testing extremely difficult.

In certain pharmacological substances on the contrary, a means of getting at this differentiation is found. Adrenalin is known to be a substance which acts solely upon the "*sympathetic*" nervous system. Its action is similar to that of electrical stimulation of the sympathetic fibers [Table I]. One may,

therefore, always regard a manifestation of the action of adrenalin as equivalent to that of stimulation of "sympathetic" fibers.

The "autonomic" nervous system can also be influenced exclusively by certain drugs. The most important of these are atropin, pilocarpin, physostigmin, and muscarin. Following the use of muscarin, pilocarpin, or physostigmin, the same effects may be produced as are obtained by stimulation of autonomic fibers. Atropin, furthermore, is a drug which is able to prevent many of the effects which would be caused by stimulation of the autonomic fibers. It is to be expected, therefore, that atropin would be able to counteract, to a certain degree, the effects produced by pilocarpin, muscarin, and physostigmin. Experimentally this may be shown to be the case.

The parallelism between physiological stimulation and the pharmacological action of these selectively acting drugs seems to be broken by the peculiar behavior of the sweat glands. While the results of anatomical and physiological investigations make it seem probable that these glands are innervated by the sympathetic, yet they react to autonomic poisons, whereas the sympathico-tonic adrenalin is able to abolish the secretion of the sweat glands.

Since pharmacological tests seem to be the most decisive, the innervation of the sweat glands must be regarded as of autonomic origin.

Before proceeding further, a tabular résumé of the antagonism of the action between adrenalin on the one hand, and of atropin and pilocarpin on the other is here presented.

A detailed review of the literature cannot be given here owing to the great abundance of facts. This table has been partly taken from the work of Froehlich and Loewi,² in part from the work on Internal Secretions by Arthur Biedl.³

These tables are chiefly of service in showing that pharmacological investigations particularly have confirmed the idea that the two nervous systems, sympathetic and autonomic, are antagonistic in their action. While adrenalin exerts equal action upon nearly all organs with sympathetic innervation, it may be seen, however, that pilocarpin has more action on some parts of

² Arch. f. Exp. Path. u. Pharm., Vol. 59, p. 34.

³ Vienna, 1910 (2d edit., 1914), English translation, Wm. Wood & Co., New York. See also Higier on the Sympathetic Nervous System in preparation for Monograph Series.

Action of Stimulation of the Sympathetic System	Action of		Organ	Action of		Action of Stimulation of the Autonomic System
	Atropin	Adrenalin		Pilocarpin	Ergotoxin	
Stim. Th. I-II	Para.	Stim.	Sphincter iridis	Stim.	—	Stim. N. III
Stim. Th. I-III	Para.	Stim.	Dilator iridis	—	—	—
Stim. Th. II-IV	Para.	Stim. i ?	Ciliary muscle	Stim.	Para.	Stim. N. III
Constrict. Th. II-IV	Constrict.?	Constriction	Salivary glands	Stim.	—	Ch. tympani. secretion
Constrict. Th. II-IVL	Dilatation	Dilatation	Cortical blood vessels	—	—	Dilat. N. X
Constrict. L. I-IV	Constriction	Constriction	Buccal blood vessels	—	—	Constrict. N. IX
Stim. Th. II-L. IV	Inhib.	Inhib.	Skin blood vessels, head region	Constrict.	—	—
Stim. Th. IV-VII	—	Constriction	Coronary blood vessels	—	—	—
Stim. Th. I-V	Stim.	Stim.	Intestinal blood vessels	—	Dilat.	—
Relax. Th. II-V	Relax.	Relax.	Genital blood vessels	—	—	—
Para. Th. II-L. IV	Para.	Para.	Sweat glands	Stim.	—	Dilat. N. pelv.
Diminished Th. II-L. IV	Diminished	—	Pilomotor muscles of the face	—	—	—
Para. Th. II-L. IV	Para.	Para.	Heart muscle	Inhib.	Para.	Inhib. N. X
Diminished ?	Diminished	Diminished ?	Esophagus	Stim.	Inhib.	Stim. N. X
Inhibition Th. II-L. IV	Para.	Para.	Cardia	Stim.	—	Stim. N. X
Relax. L. I-IV	Relax.	Relax.	Gastric tone	Increase	—	Increases N. X
Relax. L. I-IV	Relax.	Relax.	Gastric peristalsis	Increase	—	Increases N. X
Relax. Th. II-L. IV	Relax.	Relax.	Small intestine peristalsis	—	—	Increases N. X
Inhib. ?	Inhib.	Inhib.	Colon	Stim.	—	Stim. N. X
Contract. L. I-IV	Contract.	Contract.	Sphincter ani (muscle)	Spasm	—	Stim. N. pelvici
Relax. L. I-IV	Relax.	Relax.	Gall-bladder	Contract.	—	Spasm N. pelvici
Contract. L. I-IV	Contract.	Contract.	Pancreatic secretion	Stim.	—	Contract. N. X
Relax. L. I-IV	Relax.	Relax.	Bronchial muscle	Stim.	—	Stim. N. X
Contract. L. I-IV	Contract.	Contract.	Sphincter vesicæ	—	—	Relax. N. pelv.
Relax. L. I-IV	Relax.	Relax.	Detrusor vesicæ	Relax.	—	Contract. N. pelv.
Contract. L. I-IV	Contract.	Contract.	Uterus ()	Contract.	—	—
Pigle	—	—	Uterus ()	—	—	—
Heat puncture	—	—	M. retractor penis	Diminished	—	Relax. N. pelv.
Contract.	Contract.	Contract.	Carbohydrate t.	—	—	—
	—	—	Heat balance	Dilat.	—	—
	—	—	Pigment cells	—	—	—

Stim. = stimulation. Constrict. = constriction. Relax. = relaxation. Para. = paralysis. Inhib. = Inhibition.

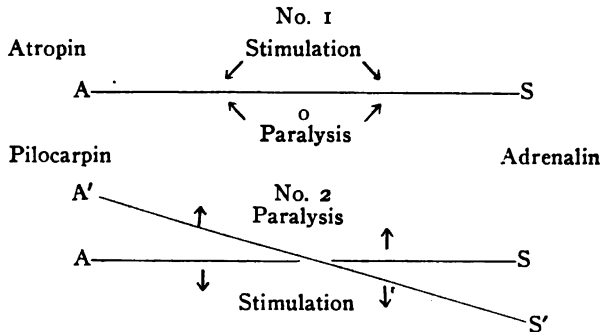
the autonomic system than on others. From this it may be seen that its effects cannot be contrasted with the universal effects of the action of adrenalin. Atropin also shows gradual differentiation in its action, since it has practically no action upon the pelvic nerve, while it exerts a powerful influence upon the cranial portion of the autonomic system. Other drugs are known which also have a powerful action upon the autonomic, more in some of its branches than in others. Pilocarpin itself acts particularly upon secretory autonomic fibers, while its action upon the heart is much less potent. This gradual differentiation is very evident if one compares the action of pilocarpin upon the heart with that of muscarin. What is emphasized in considering these two autonomic stimulants, muscarin and pilocarpin, is that their selectivity differs. In the case of the heart, for example, muscarin may cause cessation of its action, while pilocarpin and physostigmin, with the exception of a transitory slowing of the pulse, have no noteworthy effect. That these drugs do influence the cardiac branches of the vagus, however, is shown by stimulating that nerve. Thus the effect of a stimulus applied to the heart is enormously increased after the administration of physostigmin, so much so that even a mild stimulation may cause the heart to stop beating.

These few examples serve to show that the various autonomic stimulants do not have precisely similar effects, but have greater affinities for certain branches than for others, and furthermore, it is worth noting that some autonomic poisons affect the central more than the peripheral endings. Picrotoxin is an example. Finally a differentiation must be made between drugs which act as direct stimulants, and those which act by increasing the irritability, i. e., the reactibility to other stimuli. Of the latter physostigmin is an example.

In order to determine many physiological and pharmacological questions it would be of great value to have some substance which would act as a paralyzant for the sympathetic system. Opinions upon ergotoxin are divided. At any rate, it is not a drug which can be used as the desired substance for testing the sympathetic. To a certain degree, at least, it may be expected that paralysis of the sympathetic will give symptoms similar to those of stimulation of the autonomic. Thus, pilocarpin, a stimulant to the autonomic may to a certain extent be regarded as a

paralysant to the sympathetic. The symptomatic contrast of sympathetic paralysis and autonomic stimulus on the one hand with sympathetic stimulation and autonomic paralysis on the other may best be seen in the pupillary reactions to these different poisons.

The following diagram shows these relations:



In these diagrams, A S represents a balance with arms of equal length, showing the equilibrium in the tonus of the two systems. A=autonomic, S=sympathetic. If there be stimulation at S, say by adrenalin, the balance will tilt towards paralysis on the A side, as shown in diagram 2. Also, if a weight be taken from A, it will rise as in diagram 2.

Thus it may be seen how atropin and adrenalin may produce the same effects in the body, and also how pilocarpin may produce symptoms similar to those of paralysis of the sympathetic.

(To be continued)

Society Proceedings

THE PHILADELPHIA NEUROLOGICAL SOCIETY

OCTOBER 24, 1913

The President, DR. GEORGE E. PRICE, in the Chair

MENTAL DISTURBANCES IN A CASE OF TUMOR OF BRAIN SIMULATING PARETIC DEMENTIA

By Alfred Gordon, M.D.

C. A. O., 56 years of age, contractor of iron works, drank heavily until the last four years of his life. His family history is unimportant. Twenty years ago he contracted yellow fever, from which he completely recovered. He denied venereal disease. Four years ago he developed epileptic seizures. At first they occurred only occasionally, but they became quite frequent within the last week. From his wife's statement it was impossible to determine with any degree of accuracy whether the convulsions were confined to the right or left side, but while in the hospital they were seen on three or four occasions on the right side. Ten months before he died he developed hemiplegia on the right side. The paralysis was progressive. At that time a change took place in the patient's mentality. He became at first inattentive, listless, then careless about his habits. Would spit on the floor, soil his clothes. When reproached he would laugh and agree that he was wrong but would soon forget it. His memory began to fail about a year ago. Mistakes were noticed in writing letters: he would omit letters and sentences and soon forget names. He could not recollect voluntarily facts of importance, such as business transactions and money matters. On one occasion he received several checks and a half hour later they could not be found. They were recovered the next day in the vestibule. Shortly afterwards the wife noticed a difficulty of expressing himself; his speech became thick and certain letters could not be pronounced clearly.

When he presented himself for examination three months before he died, Dr. Gordon observed the following condition. He was distinctly hemiplegic on the right side. The paralysis, however, was not pronounced. The leg was dragged only slightly. There was no marked rigidity in the arm and leg; the power was diminished in both. The right knee-jerk was increased. No ankle clonus. Babinski and paradoxical reflexes were present on the right side. The biceps and triceps reflexes were increased on the right side. The face was slightly deviated to the left. The right pupil was larger than the left; their contour was irregular. The right pupil reacted sluggishly to light. A slight ptosis was observed on the right side. A dilatation of the retinal blood vessels was present, but no profound changes in the papillæ. There was a slight weakness of the left external rectus muscle. The hands and tongue showed a fine tremor.

There was some ataxia of the upper extremities. The stereognostic sense was preserved in the right hand, but the patient was unable to name all the objects placed in this hand. The general sensibility was markedly diminished on the right side. The sphincters were both involved. The patient's mentality suggested paresis strongly. His facies was drawn. His answers were slow; the speech was typically paretic, slow, with stoppage on letters c and m. He looked exhausted, but at the same time would say, "I feel fine." The memory was very poor. He was unable to recollect events of two or three days past.

Soon he began to complain of headache. Vomiting spells made their appearance. The epileptic attacks became very frequent. Finally coma developed and the man expired.

In view of the distinct clinical picture of paresis, a Wassermann test was made of the blood serum and the cerebrospinal fluid. Both proved to be negative. Lumbar punctures showed a great increase of pressure. Lymphocytosis was present.

Autopsy showed besides a cirrhosis of the liver a large tumor within the basal ganglia of the left hemisphere, destroying the largest part of the caudate and lenticular nuclei, also the adjacent part of the optic thalamus. The tumor extended downward to the base, where it appeared on the side of the pons covered by cortical substance. Histologically the tumor was a mixed-cell sarcoma. Below the tumor the tracts were degenerated.

Three months before he died he began to develop the signs of intracranial pressure. For three years and six months he did not show a single indication of intracranial pressure. The hemiplegia on the right side was mild, the sensory paralysis was very pronounced and Dr. Gordon thought at one time of the thalamic syndrome. This case was striking in resembling paralytic dementia. Three other neurologists who saw the patient besides were unanimous in this diagnosis.

RECURRENT BALDNESS OF NERVOUS ORIGIN

By Edward B. Krumbhaar, M.D.

I. S., a young man of 22, of Russian Jewish parentage, and neurotic disposition, is now recovering from his third attack of complete baldness. When first seen in August, 1912, his pate and eyebrows were absolutely free from hair (not even lanugo being present). It has been gradually returning for the past year, though it is still patchy, and not as thick as previously.

The first attack, which came on in 1906 and lasted two years, was directly attributed by him to being frightened by another boy. Before his second attack in 1909 and his present attack, no actual fright was given him, but at both periods he complained of frequent terrifying nightmares. He also complained of frontal headaches, flushing of the face and general sweating,—it was for this reason that he came to the medical dispensary—and these symptoms were aggravated by the nightmares. When seen at the Skin Dispensary by Dr. Davis, no parasites were found on the scalp, the roots of the hair were found intact, so that a good prognosis was given, and the diagnosis of alopecia areata made.

Medical examination proved negative except for a slight cardiac irregularity (of sinus-node type). No cause was ascertained for the frontal

headaches, urine and Wassermann reactions being negative, examination of eyes and digestive tract also being negative. Hemoglobin 85 per cent., red blood cells 4,500,000, blood pressure: 115 systolic; 80 diastolic.

This case apparently belongs to the so-called neurotrophic type of alopecia areata and is similar to the case described by Dr. Stelwagon in his text-book, where the onset of baldness followed immediately after a railway accident. Somewhat similar cases, with favorable termination, have been reported by Stowers (*Brit. Med. Jour.*, 1897, p. 44); Boisser (*Progres Méd.*, June 17, 1899, p. 380); Bidon (*La France Méd.*, 1899, p. 269), and M. Morris (*Text Book on Diseases of the Skin*, 1894, p. 473); but in none has there been a recurrence, as in this young man's case. A further support to the theory that the baldness is of nervous origin is the experimental proof furnished by Max Joseph, who succeeded in producing a similar baldness in cats by removal of the second cervical sympathetic ganglion.

Dr. F. X. Dercum asked whether there were a psychic shock purely or a physical trauma. He asked the question because we have so many hundreds of cases of shock as the result of accidents, railway and other, in which baldness does not follow.

Dr. E. B. Krumbhaar said that before the first attack he was threatened by another boy and before the other attacks the nearest approach to shock was rather severe nightmares.

Dr. Stelwagon in his text-book gives a case in which this condition followed a railway accident.

Dr. J. W. McConnell was reminded of a woman who had been his patient for twelve or thirteen years. In that time she has had two attacks of alopecia areata in which she was seen by Dr. Hartzell. In her case there seemed some connection between her blood condition and the loss of hair. In the first attack her hemoglobin dropped to 52 and in the second to less than 50. The woman recovered her hair very beautifully under the administration of rest and blood tonics. There was no nervous or parasitic cause in her case. The woman lost the hair under her arms and some of the pubic hair as well.

Dr. Krumbhaar said his patient had a count of 4,500,000. His loss of hair was limited to the scalp and eyebrows and not to the genitalia. The treatment was local.

Dr. Charles W. Burr presented a case of multiple sclerosis.

Dr. Alfred Gordon said three diagnoses suggest themselves to his mind: first, possibly generalized myotonia, not in the sense of the myotonia described, but simply in the sense of a hypertonicity of all the muscles; all the muscles, including those of the face, were kept rigid. Another diagnosis is paralysis agitans, as stiffness is noticed in paralysis agitans. The man's manner of holding himself while walking suggests this. Besides, while sitting his hands shake. The third possibility is, in view of the exaggerated knee-jerks and toe phenomena Dr. Burr described, whether the man is undergoing the same changes in his upper extremities as in the lower extremities and thus giving the impression of spastic upper and lower paraplegia.

Dr. T. H. Weisenburg read a paper entitled, "Loss of Emotional Expression of the Left Face similar to a patient reported by Dr. Mills in whom there was Thrombosis of the Superior Cerebellar Artery."

Dr. Charles K. Mills said: Although the loss of emotional expression

on one side of the face shows now but very little, there was no doubt at all of this loss when he saw the patient first. It was not only visible to him, but to two other persons in his office and then as he understands, although he was not present, Dr. Lloyd also saw it and remarked on its existence. Little ataxia was left when Dr. Mills saw the patient. The case, of course, interested him because of its partial similarity to one which he reported as a symptom complex of the superior cerebellar artery. It seems to him in this case the lesion was less extensive than in the one he reported. A lesion was probably of the same arterial distribution or same position, but less extensive and more amenable to antisiphilitic treatment than in his case. The ataxia, it will be observed, is relatively on the same side of the body as in Dr. Mills' case.

For several years Dr. Mills has been interested in the question of emotional expression and has presented some communications on the subject.

In connection with this subject of emotional expression, he wished in passing to put on record two recent observations. These were regarding two cases, both women, in which the patients showed the unusual symptom of *inability to laugh aloud*. In one case other symptoms present indicated that the upper spinal cord and tracts entering the cerebellum by way of the restiform body were involved. The other case also had cerebellar symptoms. In both, vertical nystagmus, among other symptoms, was present. One of these cases was shown at the recent meeting of the ophthalmological section at the College of Physicians.

Dr. Charles M. Byrnes read a paper entitled, "Clinical and Experimental Studies upon Injection of the Gasserian Ganglion with Alcohol for the Relief of Trigeminal Neuralgia."

Dr. J. Hendrie Lloyd asked about the risks of paralysis of the motor branch of the fifth nerve in these injections. He had in the last two weeks had referred to him a case of complete paralysis of the motor branch of the fifth nerve following an injection of alcohol for neuralgia of the superior maxillary division. The injection was given by a surgeon of this city. Dr. Lloyd was not present at the time of the injection. The pain ceased promptly, but the surgeon soon afterwards found that something else was the matter with the man, and sent him to Dr. Lloyd for examination. He found a complete paralysis of the motor branch of the fifth nerve. There was entire loss of power in the temporal and masseter muscles and in the pterygoids. The patient could not close his jaws, nor speak clearly, and he had drooling. Dr. Lloyd thought his condition a very serious one. He would like to know the prognosis in such a case. He was not able to say just what the operation was. The patient when sent to him had a little antiseptic dressing on the side of his face, but it was said that there had been an injection of alcohol into the superior maxillary division of the fifth nerve. He had had bilateral trigeminal neuralgia, and had been operated on three months before on the right side, and then the pain recurred on the left side. The motor paralysis, however, was unilateral, and was on the left side, where the alcoholic injection had been given. Dr. Lloyd thought it was a very interesting complication and a very important one.

Dr. William G. Spiller said he had been very much interested in Dr. Byrnes' work and had urged him to carry it on as he felt that Dr. Byrnes, from his thorough knowledge of the anatomy of the parts, was well fitted for giving this treatment. Dr. Spiller thought the time had not been sufficient to determine whether the pain will return or not in Dr. Byrnes' cases.

One would hardly expect the pain to return in exactly the same way as after injection of the peripheral branches. There must be a very considerable destruction of the cells of the Gasserian ganglion after an alcohol injection, though probably all the cells would not be destroyed or there could not be a return of sensation, and Dr. Byrnes had spoken of a return of sensation in a comparatively short time. The degenerated cells must have degenerated axis cylinders in the sensory root, and it is not probable that the regeneration of the axis cylinders in this root from partially affected nerve cells would be complete and extend to the portion within the pons. It is not probable that fibers will regenerate where they have no neurolemma sheaths. We have no evidence of return of function from regeneration of fibers within the central nervous system. Dr. Byrnes stated that he injected the ganglion in two cases in such a way as to preserve the integrity of the first branch. In some work Dr. Spiller carried on some years ago with Dr. Frazier he came to the conclusion that the different branches of the fifth nerve are separately represented in the Gasserian ganglion and in a considerable degree throughout the spinal root.

Dr. T. H. Weisenburg said he had been injecting patients in the peripheral branches for a number of years and sometimes results have been very encouraging. Other times he had sworn he would not do it again. Dr. Byrnes' method is certainly a better one than the peripheral method. It should be cleaner. He asked Dr. Byrnes how far to push the needle after it goes into the foramen ovale so as to get it into the Gasserian ganglion. It is rather important to know. The whole question is whether or not you can have regeneration in the sensory root. Some years ago Dr. Weisenburg had a patient with tic douloureux in whom the Gasserian ganglion was cut by Dr. Frazier and in whom Dr. Weisenburg found some regeneration in the sensory root. He was not at all satisfied that it could really be so. Within the past six weeks he had had an interesting experience. Seventeen years ago Dr. Keen removed the Gasserian ganglion for tic douloureux, the ganglion being sectioned. Seventeen years later the patient had the same kind of a pain in the same area. Dr. Weisenburg did not know how to explain it.

Dr. D. J. McCarthy said those of us who remember the early technique of operations on the Gasserian ganglion can readily recall that the technique was to expose the ganglion with more or less hemorrhage, and then a section of the peripheral branches was made and a section as far back as possible of the roots, then a hemostat was introduced and the nerve completely rolled up and withdrawn. One can understand how easily some of the ganglion might be left. He remembered Dr. Spiller's examination in some of those cases in which the ganglion was spread out and showed many broken parts.

Dr. F. X. Dercum said that at the Jefferson Hospital they had last spring a woman who had a number of years ago been operated upon by Dr. Keen for trigeminal neuralgia, it being one of the cases in which the sensory root of the Gasserian ganglion had been evulsed. For some time before readmission she had deteriorated very greatly in her general health. She had marked arterio-sclerosis, had lost greatly in weight, was mentally depressed, cried a great deal, complained incessantly of pain and apparently of the same character as she had had formerly. She was put to bed and kept in bed persistently for a number of weeks. The case was at first very puzzling, but subsequently the pain disappeared. She asserted she was well and left the hospital. Whether her recurrence of pain had been brought about by her depression Dr. Dercum did not know, but he regarded the pain as psychic. As her health improved, the pain disappeared.

Dr. D. J. McCarthy called attention to a word of caution as to operations in early cases of tic douloureux. He referred to one of Dr. Keen's cases in which a surgeon of Buffalo, or someone else, had removed the Gasserian ganglion. There was recurrence and Dr. Keen removed the ganglion again. Dr. McCarthy said his opinion, based on his experience at Blockley, St. Agnes and private practice, is that unless the patient has evidence of fairly well defined arterio-sclerosis operations, more particularly radical operations, are not justified. He would not like to make this as an absolutely dogmatic statement, but it is in conformity with his personal experience. The average case that one sees at Blockley with good soft arteries, a low blood pressure, a tic douloureux does not call for operation. He was aware of the cases of drawing teeth as a means of relieving peripheral irritation and the usual foolishness of such procedures. Where the teeth are really at fault a thorough study of these cases usually results in fairly definite information in some direction or other which carried out gives good results. One case particularly of a man who had tic douloureux where the filling was removed from the tooth and the pain entirely disappeared. This man had a history of syphilis and a positive Wassermann. About a year later he returned with a recurrence of pain and thorough study of the case was made, more especially in regard to the teeth. He became discouraged and went to a hospital and had one or two section operations on the nerves. In the meantime an X-ray examination showed a wire broche broken off in one of the tooth canals and protruding through the root to the bone. Here at least was reason in a man of that type for a condition of reflex pain in the distribution of the fifth nerve. As to this matter of the Gasserian ganglion: In old age with arterio-sclerosis and hypertension the internal carotid swells out in the entrance of the skull into an aneurysm of the fusiform type. It is well in injections to keep this in mind. This aneurysmal dilatation of the internal carotid is a possible etiological factor for the development of tic douloureux. On account of the arterio-sclerosis and the alteration of the position of the one or two supplying arteries given off to the Gasserian ganglion from this portion of the carotid an anemic condition results with secondary atrophic degeneration of the cells of the ganglion. When dilated the carotid pulsates directly against the Gasserian ganglion and in this way may also keep up a constant irritation of the ganglion or its peripheral or central connections.

Recently in a case reported by Dr. Müller, a case of tic douloureux, where peripheral operation was done where it was thought there was some disease of the ganglion, the pain had returned and the patient went to a Christian scientist and the pain immediately disappeared.

Dr. Alfred Gordon said he had a personal experience of three cases in elderly individuals in which the Gasserian ganglion was totally removed and the pain returned with the same severity as before operation. In one particular case, the last one which he saw a year ago, the woman was operated on by Dr. Deaver; a peripheral operation was done which relieved the patient for a short time. Finally the radical operation was done. The patient had some relief for four or five weeks. Then the pain returned with the same severity. About that time she began to develop mental phenomena and Dr. Gordon heard recently that she died with mental phenomena and exceedingly severe pain. In aged individuals there is a possibility that the condition of the blood vessels has something to do with the return of pain. Dr. Gordon was as much at sea as Dr. Weisenburg as to an exact explanation of return of pain after removal of the Gasserian ganglion.

Dr. Charles K. Mills said as to the question why the pain returns after the supposed complete removal of the Gasserian ganglion he believed it is because, in some of the cases at least, the ganglion has not been completely removed. He made some investigations when he was writing a paper on the sensory functions attributed to the seventh nerve, of cases which had been operated upon by different surgeons and he became convinced that the ganglion had sometimes not been removed. In some instances also of supposed resection of the sensory root of the fifth nerve the root had not been cut, although the cases had been reported as instances of complete operation of these sorts. In most of them there was at least temporary and in some cases rather long continued relief from pain. Dr. Mills had some investigations made in connection with members of the surgical staff in the University Hospital in regard to the difficulties attending the cutting of the sensory root. Facts of this kind must be borne in mind.

Dr. F. X. Dercum said he had of late years had very few of his cases of tic douloureux injected and very few operated upon; certainly a much smaller number than in former years. He had at present three cases of typical tic douloureux under his care at the Jefferson Hospital. All three are upon massive doses of strychnia. Two have already improved after a few days of treatment.

Dr. T. H. Weisenburg said he had the brain from a case in which a distinguished surgeon from Baltimore was supposed to have removed the ganglion. The ganglion was not removed, although the surgeon said he had removed it, and he had done a great many of these operations. Dr. Weisenburg has three brains in which the ganglions were said to have been removed by different men, and in every one there had been large slices of the temporal lobe removed.

Dr. William G. Spiller asked whether Dr. Dercum had had any success with massive doses of strychnia in the treatment of occipital neuralgia. Strychnia was originally recommended by Dana for tic douloureux and has been used successfully by many over a long period.

Dr. F. X. Dercum said that strychnia is one of the most important therapeutic agents we have in tic douloureux. The trigeminal nerve is a remarkable nerve in very many respects and differs from all others in two particulars; first in its remarkable power of regenerating after section or resection of its branches, and secondly in the efficacy of strychnia in the control of pain when seated in its distribution. Strychnia, strangely enough, does not influence pain in any other situation, but does control the pain of trigeminal neuralgia beyond question, and this is one of the remarkable facts of therapeutics. Other nerves in various portions of the body present peculiarities, such, for instance, as the tendency of the sciatic nerve to be involved in rheumatism, or of the supraorbital branch of the trigeminal to be affected in malaria. Clinical facts like these are difficult to explain but they must nevertheless be admitted as facts. The remarkable action of strychnia in trigeminal neuralgia must be emphasized and it should always be tried before operative interference, even injections are resorted to. When possible the patient should be placed in bed and the strychnia given hypodermically, first in moderate doses and later increasing them until as much as a twentieth is taken every three or even every two and a half hours. As a rule the pain subsides long before such massive doses are given. If strychnia fails then surgical interference should be considered but not before.

Dr. Charles M. Byrnes asked in regard to Dr. Lloyd's question in ref-

erence to paralysis of the motor root, where the dressing was on the patient's face.

Dr. J. Hendrie Lloyd could not give the exact point. The injection was made to strike the superior maxillary nerve, a branch of the fifth, and resulted in the cessation of the pain and paralysis of the motor branch.

Dr. Byrnes did not see how the motor root could have been affected from an injection of the second branch.

Dr. Lloyd asked what is the prognosis of recovery.

Dr. Byrnes replied that it was good. It may take six or eight months. In regard to the possibility of regeneration there is no doubt in his mind that many of the cells have been so changed that regeneration will not occur. Dr. Weisenburg's question concerning the depth to which the needle is introduced should have been mentioned. The foramen ovale is usually reached by Hartel's method at a depth of 6 cm., then the needle can easily be introduced 1.5 cm. without further danger. The anterior surface of the petrous portion of the temporal bone forms a much more obtuse angle in the dog than in the human, and in the former a depth of 1 cm. may be used with safety. Dr. McCarthy's question concerning arterio-sclerosis is very interesting. Dr. Byrnes did not quite agree with him that only those cases with arterio-sclerosis should be subjected to surgical procedures. Because a patient has no peripheral arterio-sclerosis, it does not follow that he has no sclerosis in his cerebral centers. Dr. Byrnes could confirm this from the examination of a ganglion removed from a person who had pronounced peripheral sclerosis, while the ganglion showed little or no change in the vessels. Dr. Spiller's work has shown that increase of arterio-sclerosis thickness is quite common, and Dr. Byrnes' studies have confirmed these earlier observations. Dr. Dana has also shown similar changes. Dr. Byrnes has also noticed in many cases of tic douloureux that not infrequently the facial artery on the affected side feels a little more firm than that on the opposite side. Dr. Dercum's suggestion of the return of the pain being probably due to psychic origin is quite acceptable. Dr. Byrnes believed that the great majority of recurrences are due to incomplete removal of the ganglion. As Dr. Spiller suggested, Dr. Byrnes had never found a perfectly complete ganglion after surgical procedures. On the other hand, he saw one very interesting case of this kind. The patient had had two, possibly three, attempts at gasserectomy. Having had the first operation in some western city, without relief, he came to Dr. Cushing who felt that the ganglion had not been perfectly removed. Dr. Cushing operated and some time later the pain returned, associated with facial paralysis upon the same side. In order to relieve the facial paralysis spinal accessory anastomosis was done. Some time elapsed when he again returned, complaining of pain in the old trigeminal distribution. It was not a typical tic douloureux attack, but a different kind of pain. The question was what was the possible pathway. About that time Hunt's clinical experience and anatomical studies on herpes made their appearance, in which he attempted to reconstruct the anatomy of the facial nerve; which suggested the geniculate ganglion as a possible source, and Dr. Cushing suggested that the pars intermedia be sectioned. Anatomically Dr. Byrnes could not see Hunt's foundation for his views and accordingly did not advocate such a procedure. He was told, however, that the operation was performed without marked success. Then the only other possibility which occurred to Dr. Byrnes was the inclusion of certain sensory elements in the spinal accessory root, which he thought perhaps might account for the return of pain, and suggested that

the face be reparable with the hope of lessening the pain. He did not come prepared to go into the various medical treatments of tic douloureux. In regard to the use of strychnia, he had seen a number of patients who had been temporarily benefited by its use. In fact the first case he saw had taken strychnia for some time and while in his office was affected with moderate tetanic contractions. Personally, he had had no experience in either trigeminal or occipital neuralgia.

NEW YORK NEUROLOGICAL SOCIETY AND SECTION ON
NEUROLOGY AND PSYCHIATRY OF THE NEW YORK
ACADEMY OF MEDICINE

JOINT MEETING, HELD ON NOVEMBER 11, 1913

DR. SMITH ELY JELLIFFE AND DR. I. STRAUSS in the Chair

THE IRREGULAR BONY FORMATIONS OF THE SELLA
TURCICA IN SOME EPILEPTICS

By L. Pierce Clark, M.D., and E. W. Caldwell, M.D.

A joint paper on this subject was presented with lantern slide demonstrations. The authors stated that cranial asymmetries and osseous deformities in epileptics had long since been the object of intensive study by many able investigators. A thickening of the skull, general or in special parts, had been carefully studied by American writers, including Peterson, Sachs, Fisher, Prout and Clark. In some instances the skull thickenings were very limited in area, forming the exostoses described as osteosclerosis by Binzwanger. Some young epileptics presented a markedly thickened skull, but usually the thickness was increased after the twenty-fifth year and became very marked after the fortieth year. The calvarium of the epileptic was heavier than that of the normal individual of the same age. These facts, and others bearing upon cranial thickenings and asymmetries, formed a striking part of the literature of epilepsy. Müller, in an examination of the heads of forty-three epileptics, found but four that he considered normal, and it was at once apparent that when we attempted to estimate the importance of the special cranial deformities and variations in epileptics, one entered upon a particularly difficult task. This was especially true when one selected so small a part of the base of the skull as the osseous formation of the sella turcica, a part of the skull which, until very recently, had attracted but little attention. Comparative studies of this region in health and disease were still to be made, and we were soon to face the problem more definitely, and solve its bearings upon epileptic states. The issue would not be so much upon the significance of the relationship which sella deformities might have upon the cerebral content itself, as the bearing the variations had upon the possible alteration of function of the posterior lobes of the pituitary bodies, and the rôle this defect or alteration of function might have upon convulsive disorders of epileptics in particular.

Dr. Clark said the very considerable variations of the bony formation of the sella turcica in epileptics was first called to his attention by Dr. Caldwell, who had made a number of X-ray examinations in the routine study of the speaker's cases. He believed that Dr. Caldwell's notice was

particularly directed to this peculiarity of the sella in epileptics by Dr. Johnston, of Pittsburgh, who had not yet published his full study of the subject. The work on the sella and its variations in health and disease by Cushing and others were fairly familiar to all. Three types of the pathologically deformed and enlarged sella had been distinguished and classified by Cushing. The one with which the authors were immediately concerned was associated with thickening of the clinoid processes and dorsum ephippii. Here the enlargement was accompanied by thickening of the walls, but inasmuch as Cushing stated that this type was confined to the acromegalics and gigantics, he believed the bony thickenings were merely a feature of the osseous tendency to overgrowth, which, of course, threw no light on the condition shown in some epileptics.

The circulatory disorders in epilepsy shown frequently in slow pulse, vasomotor stasis in the extremities, and, in the speaker's experience, an invariably low blood pressure when arterio-sclerosis was not advanced, the tendency to obesity and a ravenous appetite might make one pause before excluding the possibility that there may be some association between epilepsy and a marked disturbance of the pituitary body, and that it might ultimately be found that pituitary disease may sometimes have more or less bearing upon some types of epilepsy in some of its broader and more general manifestations. Certain it was that in so mysterious a disease as epilepsy we had need of the widest possible study in its causation.

Dr. E. W. Caldwell then gave a brief clinical outline, with lantern slide demonstrations, of a few cases of epilepsy showing bony variations in the sella turcica.

Dr. Clark, in reply to a question, said that little or no reference had been made to this condition of irregular bony formations of the sella turcica by those who had made a special study of the cranium, and its significance could only be conjectured. Dr. Johnston, of Pittsburgh, was the first to suggest that it might have some bearing upon epilepsy, and the treatment of his cases with pituitrin had been followed by rather remarkable results. His own experience with the remedy in epilepsy, Dr. Clark said, had been unsatisfactory.

BRAIN STRUCTURE ACCORDING TO AGE

By H. H. Donaldson, of the Wistar Institute, Philadelphia

A series of lantern slides were shown, illustrating changes that occur in the brain according to age. Dr. Donaldson traced the histological changes from birth to maturity, limiting himself to brains that were normal at birth and free from hereditary taint, the only sources of modification considered being those represented by deficient nutrition. Slides showing the alterations in the chemical constitution of the brain from birth to maturity, as determined by Dr. Koch, were also presented. The influence of age on the human brain weight was discussed, and a corrected graph for these weights was shown.

NEWER RESEARCHES CONCERNING THE HYPOPHYSIS

By Frederick Tilney, M.D., of Brooklyn

Dr. Tilney, with the aid of reconstruction models and lantern slide illustrations, gave the result of his recent research bearing upon the devel-

opment of the hypophysis in man and certain birds and mammals. By this work, which was carried on in the laboratory of Professor Huntington, of Columbia University, it was now possible to give an embryological, histological and morphological description of a hitherto undescribed portion of the hypophysis. This portion is known as the pars tuberalis. The ontogenesis of the organ demonstrates the necessity of revising the nomenclature applied to the pituitary body, inasmuch as certain neural and glandular elements have not hitherto been recognized. The study of the development in a number of vertebrate forms is the basis for the following classification of the several parts of the organ:

I. The pars neuralis, consisting of (a) the eminentia saccularis of the tuber cinereum; (b) the infundibulum; (c) the infundibular process. II. The pars glandularis (epithelial), consisting of (a) the pars tuberalis (hitherto undescribed); (b) the pars infundibularis; (c) the pars distalis.

Dr. Tilney said the complete report of this research was now in press, and would appear in the *Internationale Monatsschrift für Anatomie und Physiologie*, Bd. XXX.

SOME CAUSES OF DISAPPOINTMENT IN OPERATIONS ON BRAIN TUMOR

By William G. Spiller, M.D., of Philadelphia

Dr. Spiller said the discussion on brain tumor introduced by Bruns and Tooth at the recent International Congress in London called forth some discouraging statements. Bruns said that about 30 out of 100 brain tumors were so situated that a radical operation might be advised; the localization was accurate, and the tumor in these cases was accessible. He believed we might expect surgical success in from 3 to 4 per cent. of all brain tumors. Tooth studied the records of 500 cases of brain tumor at the National Hospital obtained during the years 1902 to 1911, inclusive. Of these, about half came to operation. He thought a high mortality was inevitable, but that it could be reduced by a judicious choice of cases and by selection of the operation best suited for individual cases. The immediate dangers common to all growths, all situations and apparently all operations were shock, collapse and respiratory and cardiac failure.

Dr. Spiller said that many causes of disappointment would occur to any one familiar with operations for brain tumor. The best known were incorrect diagnosis; the infiltrating character, large size and inaccessible situation of the tumor, errors in technique and impaired general vitality. While others equally important might be mentioned, the speaker said he desired in this communication to speak of the enlargement of the brain associated with tumor, the distortion of the brain, especially from tumor in the posterior cranial fossa, and the acute swelling of the brain, which was probably an important element in the production of hernia cerebri.

Increase of intracranial pressure was believed to be the cause of many of the general symptoms occurring with brain tumor, and it would seem from the writings of certain authors that the increase of pressure was attributed directly to the tumor and varied with the size of the growth. There was a condition resulting from tumor to which little attention had been paid, and which was as important, if not more so, than the size of the tumor itself, namely, enlargement of the brain. This hyperplasia was not

directly proportional to the size of the tumor: it might be moderate with a large tumor or sufficient to cause much enlargement of one cerebral hemisphere where the tumor was small. The hyperplasia might be the result of irritation either from pressure, or possibly from some substance elaborated by the tumor, and was caused by an overgrowth of neuroglia tissue. The condition was not unknown in medical literature, although little was said concerning it. This hyperplasia of the brain might occur with any variety of tumor, and was not confined to glioma. It should not be confused with enlargement from glioma tissue, for it had not the appearance, microscopically, of tumor nor should it be confused with the acute brain swelling of Reichardt. The sudden fatal termination that occurred in some cases of tumor was probably the result of this enlargement of the brain, and of interference, by the general increase of intracranial pressure, with the important functions of the medulla oblongata. It might also be that hyperplasia of the brain was an important cause of impairment of mentality in some cases of brain tumor.

Distortion of certain parts of the brain was a grave complication of tumor. The displacement of the cerebellum and the occipital lobes complicated the operation, and sudden relief of pressure probably had injurious effects on parts that had been distorted gradually. Cranial nerves in the region of the medulla oblongata were liable to be stretched gradually by such distortion, and the effect of this stretching on the pneumogastric nerve might be serious.

Hernia cerebri was a serious complication of brain tumor. Where it resulted from decompression it had been supposed to be indicative of the degree of intracranial pressure and to show to what extent the pressure had been relieved. This view was not entirely correct, as such a hernia may develop in cases where there had been no decided increase of intracranial pressure. A hernia may cause pressure against the edges of the opening in the skull, with occlusion of vessels and softening of the part of the brain implicated in the hernia, causing in this way hemiplegia and other grave symptoms.

In connection with his paper, Dr. Spiller showed a number of lantern slides illustrating this condition of hyperplasia of the brain, with enlargement of the hemisphere, complicating brain tumor. Also pictures of distortion of the brain caused by tumor.

Dr. M. Allen Starr said he had seen a number of cases of brain tumor associated with a distinct hypertrophy of the corresponding hemisphere, but he had never ascribed to this condition the novel and very interesting explanation offered by Dr. Spiller, nor could he recall any reference to it in the literature. The form of hypertrophy that followed operation in some cases and failed to occur in others had often puzzled him: he could not understand why in some cases after an operation for brain tumor there should develop an enormous hernia cerebri, while in other cases it was entirely absent, and he did not believe that it was always an evidence of sepsis.

The distortion of certain parts of the brain resulting from tumor was a well recognized fact, and by causing pressure upon or stretching the cranial nerves, it might give rise to secondary symptoms and obscure the diagnosis.

Dr. Starr said that a review of his last fifty cases of brain tumor seen in private practice showed that the diagnosis as to the location of the growth was possible in thirty; in the remaining twenty, its location could not be definitely determined. In twenty of the fifty cases, an operation

was urged, and in eighteen of these it was actually performed. In eleven of the eighteen the operation confirmed the diagnosis, and the tumor was removed; in two the tumor was found, but could not be removed on account of difficulties encountered in connection with the operation; in five nothing was found. The death rate was 6 per cent.

Dr. B. Sachs said that while doubtless many had observed this hyperplastic enlargement of the hemisphere accompanying brain tumor, he thought Dr. Spiller was wise in attempting to lay stress upon it. Referring to the causes of disappointment in operation on brain tumor, Dr. Sachs said that at the recent International Congress in London, Sir Victor Horsley made the statement that unless the diagnosis was made before the appearance of optic neuritis, which was generally regarded as such an important feature of the condition, it was almost too late to do the patient any good. This, Dr. Sachs thought, was rather an extreme view; in the recognition of this condition, it was not an easy matter to forego the advantages that went with the presence of a pronounced optic neuritis, and he could recall a number of instances where the diagnosis, without the eye symptoms, would have been practically impossible. In a case that was recently under his observation there was no optic neuritis, but there was evidence of tumor involvement of the fifth nerve. In addition to this, there were marked cerebral symptoms and an operation was contemplated, but after three weeks observation in the hospital and under simple hygienic treatment all the symptoms gradually disappeared with the exception of the fifth nerve involvement, and the patient had been temporarily discharged. Dr. Sachs said he still believed that here they had to deal with a brain neoplasm, but the patient was so much better that the idea of an operation had been abandoned for the present, at least.

In their work at the hospital during the past year, X-ray plates of the cranium had been carefully studied with regard to possible changes in the formation of the sella turcica in the presence of certain brain lesions; their results, however, had proven of no practical value and were about as negative as those reported by Dr. Clark to-night in connection with epilepsy.

The high mortality accompanying operation for brain neoplasms might perhaps be lessened to some degree by a more careful manipulation of the brain. The most gentle manipulation and the rapid checking of hemorrhage he regarded important factors in the reduction of the death rate after these operations.

Dr. Robert Abbe said he was quite in accord with what had been said in regard to the disappointments attendant upon operations for brain tumor, and he had practically come to the conclusion that decompression was the operation of choice, both on account of its comparative simplicity and the benefits that accrued from it. He had in mind several instances where this procedure was followed by great prolongation of life, together with improvement in the eye symptoms. In one case, where no tumor was found, although that diagnosis had been made and was well founded, the patient survived a decompression operation for four or five years, and has resumed work. In another case, where the sight had been entirely lost, the decompression resulted in restoration to health and the patient was alive three years after the operation, when she was lost sight of.

Dr. J. Ramsay Hunt said that in common with others he was familiar with the enlargement of the convolutions and parts of the hemisphere in the neighborhood of brain tumors, and that he had always regarded it as the result of stasis due to an interference with the circulation near the

growth, of the blood and lymph stream. A similar condition was observed in abscess formation of acute onset, and under those circumstances the term hyperplasia was certainly scarcely applicable. The speaker said he would be inclined to attribute this swelling and enlargement to a chronic stasis and edema and not to a true hypertrophy or hyperplasia of brain tissue.

That in old cases, as a result of pressure and stasis, there should be some changes in the appearance and relation of the histological elements is not surprising, but certainly in his experience there had been nothing in the microscopic picture of the swollen region that would have suggested the occurrence of hypertrophy and hyperplasia.

Dr. Walter Timme said that in the May, 1913, issue of the *JOURNAL OF NERVOUS AND MENTAL DISEASE* he had published an article giving the results of some observations made in Dr. McCallum's laboratory, which perhaps might throw some light on this subject. The experiments were in connection with artificial nerve pressure, produced by tying the vagus nerve above the diaphragm enough to cause pressure but without severing the nerve. It was found, upon killing the animals four or five months later, that there was a remarkable hyperplasia in the glands of the wall of the stomach. The number of glands of the stomach was increased from 5,000,000 in the normal cat, to over 9,000,000 in the operated animals. When both vagi were treated in this way, the hyperplasia of the glands was more pronounced. There was perhaps some analogy between this condition and the hyperplasia of the brain tissue observed by Dr. Spiller in connection with the pressure produced by brain neoplasms.

Dr. Charles A. Elsberg said that he also had noticed this asymmetry between the size of the two lobes in cases of brain neoplasm, and had ascribed it to an increase of the fluid content on the affected side. He did not understand whether Dr. Spiller attributed the occurrence of hernia cerebri to this hyperplasia. In many cases of hernia cerebri, the protrusion could be reduced by elevation of the patient's head or by lumbar puncture or by aspiration of the ventricles or the corpus callosum, or by a combination of these methods. The speaker called attention to the varying degrees of pressure that existed in these cases; thus at times we had a large, tense hernia occurring without apparent explanation, while at other times the protrusion might be almost collapsed, and if it was attributable to this condition of hyperplasia, it would be difficult to understand these marked differences in the pressure.

Dr. Elsberg said that within the past few years he had seen two cases of tumor in the left frontal region, both located in the cortex and of the endothelial type, where the wrong side of the brain was exposed. In both of these cases there was no increase in pressure: on the contrary, there was a diminution to such a degree that it led to a later opening of the skull on the opposite side, where the tumor was really located.

Dr. Foster Kennedy asked Dr. Spiller if by hyperplasia he really meant an increase in the brain elements or whether he referred to an edema of the brain. In the more acute types of rapidly growing gliomata, edema seemed to be the largest factor. He also inquired whether the reader of the paper regarded this edema or hyperplasia extending to a point some distance from the growth as a misleading factor in the diagnosis of brain neoplasms. Personally, he had always thought that the edema produced by a brain tumor varied inversely with the distance from the tumor and that the symptoms would correspond with the lines of pressure radiating from the tumor.

Dr. Kennedy then described two cases of expanding cerebellar lesions producing much edema, and consequent equivocal diagnostic signs which, however, were the result not primarily of the edema, but secondarily of the intense medullary and pontine distortion, and constriction of unusual tracts by the foraminal ring.

Dr. Spiller, in closing, said that in his paper he did not discuss edema of the brain. That was an entirely different process insofar as it related to increase of fluid in the brain. He spoke of hyperplasia, which referred to an overgrowth of the neuroglia tissue. In these cases, as shown by the microscope, there was little increase of the neuroglia cells, but sometimes proliferation of the neuroglia fibers could be demonstrated. The hyperplasia possibly was caused by chemical changes resulting from some substance elaborated by the tumor; but more likely from irritation by the tumor. It was probably not the cause of hernia cerebri and should not be confused with edema or acute swelling of the brain, which probably has some relation to hernia. This hyperplasia may extend for a considerable distance beyond the limits of the tumor, and possibly may be in part the cause of the symptomatology of brain growths. We knew that a tumor of the brain may be removed at times in its entirety, and yet the symptoms may not entirely disappear, and possibly this persistence of symptoms may be attributed to alteration of nerve cells, to hyperplasia, or other changes. The same was true after a decompression operation. The mere relief of pressure does not usually remove all the symptoms, and the speaker said he had known the condition to be aggravated by a decompression. He had shown lantern slides of a brain in which a very small subcortical tumor of the parietal lobe had caused great enlargement of the cerebral hemisphere of the same side. It would be unreasonable to attribute the hyperplasia in this case to stasis and edema of the brain. Such conditions as these described were the causes of many disappointments in operations upon brain tumor.

Pertiscope

Archiv für Psychiatrie und Nervenkrankheiten

(50. Band, 3 Heft)

XX. Frequency of the Wassermann Reaction in the Cerebrospinal Fluid in General Paralysis. PAUL KIRCHBERG.

XXI. Encephalomyelitis Following Smallpox. OTTO KLIENEBERGER.

XXII. Contribution to the Subject of Hysterical Situation Psychoses. FELIX STERN.

XXIII. Ependymal Gliomatosis of the Cerebral Ventricles. M. S. MARGULIS.

XXIV. Osteomalacia and Psychoses. Continued. W. M. VAN DER SCHEER.

XX. *Wasserman Reaction in General Paresis*.—Kirchberg has examined the spinal fluid and blood in one hundred cases of general paralysis, and finds a positive reaction in 78 per cent. of the cases in the spinal fluid, and 93 per cent. in the blood; or, conversely, 22 per cent. of the cases show a negative reaction in the spinal fluid as contrasted with only 7 per cent. in the blood. A detailed account follows of the case in which the positive and negative results were found in blood and fluid. It is of interest that in the 22 cases with negative Wassermann reaction in the fluid, 11, or 50 per cent., were cases of taboparalysis. Inasmuch, therefore, as a higher percentage of the taboparalytic cases showed a negative Wassermann reaction in the fluid, it follows that a negative Wassermann reaction cannot longer be considered as a determining differential point between tabes and general paralysis. In general, Kirchberg concludes that the diagnosis of general paralysis should never be excluded because of a negative reaction in the spinal fluid; since, as his investigation seems to show, such a negative reaction occurs very much more often than is ordinarily supposed. He insists, therefore, that the importance of a clinical study of cases has not been diminished by the introduction of the Wassermann test.

XXI. *Encephalitis Following Smallpox*.—Klieneberger reports a case in detail in which certain paralyses with motor aphasia followed an attack of smallpox. These paralyses were greatly improved but did not entirely disappear, whereas the aphasia lasted only seventeen days. Six or seven years later, a tremor appeared in the right arm, which extended ultimately to the entire body. This also improved. Still later, disturbances of nutrition appeared, with enlargement of the hands. Associated with this were various disturbances both of the nervous system and of other organs. The diagnosis of encephalomyelitis was finally made and its association with the original attack of smallpox is discussed at length. The case is of interest from the possible infectious etiology of a diffuse nerve lesion.

XXII. *Hysterical Situation Psychoses*.—Under the term *hysterischen Situationspsychosen* Stern considers those psychogenic disturbances of criminals which usually run their course under the picture of a dreamlike or delirious confusion, reaching even to deep stupor, and hitherto usually described as hysterical twilight states or hysterical stupors. The condition occurs in persons predisposed to mental disorder under the influence of an

unfortunate situation, and are usually favorable in outcome, particularly if a change in the situation of the individual can be effected. The writer concludes in part as follows: That this type of nervous disorder must be considered if the symptomatic picture is that of a catatonic or epileptic psychosis even if epileptiform attacks of distinct character have preceded. These place psychoses develop for the most part on the basis of a well-defined psychopathic constitution. Various disturbances of the sensorium occur, from acute stupor or conditions of confusion (which are the more common) to very much slighter disturbances of similar character. There may also be a considerable change in the condition from time to time. The prognosis is peculiarly good, and usually no mental defect is left after recovery.

XXIII. *Ependymal Gliomatosis of Cerebral Ventricles.*—Margulis, on the basis of seven cases, discusses changes in the ependyma of the cerebral ventricles, and reaches the general conclusions, that the anatomical picture of an ependymal gliomatosis consists in a hyperplasia of the ependymal lining and in the development of peculiar areas of gliomatous overgrowth of differing age; that in the cortex, as well as in the speech cortical substance, a distinct proliferation of glia tissue exists; that ependymal gliomatosis is also found in other proliferative gliomatous processes in the brain; that ependymal gliomatosis is a localization of a general proliferative gliomatous process; that changes of inflammatory character in vessel walls are not found in the gliomatous areas; that ependymal gliomatosis is analogous to the so-called Chaslin sclerosis in the cortex; that the ependymal gliomatosis is to be regarded as a productive and progressive process as well as a primary one; that it may be caused by an infectious or toxic agent.

XXIV. Continued article.

E. W. TAYLOR (Boston).

Deutsche Zeitschrift für Nervenheilkunde

(Band 45, Heft 1 und 2)

1. A Case of Hereditary Familial Disease of Transitional Type between Spastic Spinal Paralysis and Friedreich's Disease. DOBROCHOTOW.
2. A Further Contribution to the Recognition of the Compression Syndrome by Examination of the Cerebrospinal Fluid. RAVEN.
3. Concerning the Nature and Significance of the Changes in the Liver and the Pigmentation Associated with Cases of Pseudosclerosis, together with a Contribution to the Study of Pseudosclerosis (Westphal-Strümpell). RUMPEL.
4. Metastatic Adenoma of the Thyroid Gland presenting a Picture of a Tumor of a Vertebra with Compression Myelitis including a Method of Exploratory Excision of the Bone-marrow from the Deep-lying Bone. JACOBÆUS.
5. Pathogenesis of Post-diphtheritic Paralysis of Accommodation. AUERBACH.
6. Two Brothers with Myxedematous Idiocy, with Thyroid Gland present and not grossly altered. GOLDSTEIN.
7. A Contribution to the study of Spontaneous Subarachnoidal Hemorrhage. FORSHEIM.
8. Concerning the Relapses of Traumatic Neuroses. WIMMER.
 1. *Hereditary Familial Disease.*—A patient who upon superficial ex-

amination presented the appearance of having multiple sclerosis, stated that half of his relatives suffered from the same disease. The author visited the home town of the patient and studied the histories of many members of that family. One case is described in detail. In two generations 11 cases were found, 6 of whom were women.

In the summary the author states that the births were at term and normal. No convulsions in childhood. Between the ages of 8 and 12 years, the gait became altered gradually. The child began to walk with the knees adducted and hit the floor with his soles. The legs were turned outward so that genu valgum developed. The feet pressed more and more on their inner border giving the appearance of flat-foot. The picture is explained through the beginning contracture and stiffness of the adductor muscles of the thighs. The legs become spread farther apart, are very untrustworthy and the individual stumbles and falls. At this stage the calf muscles become involved and the feet gradually assume a varied position. Later the heels are raised and the gait takes on a frankly spastic, dancing character. Finally the steps become bow-like, the trunk being turned to the opposite side. Nystagmus is an early sign and may be an initial symptom. Late manifestations are alterations in the voice, ankle clonus and Babinski sign.

The disease must be differentiated from Erb's spastic paralysis of familial hereditary form, diplegia infantum of Freud, disseminated sclerosis and Friedreich's disease.

2. *Compression Syndrome.*—The author adds 7 cases to the 15 previously reported and hopes that he may be able to perfect his findings so as to enable him to determine, by the characteristic differences in the fluid, the kind and the point of origin of the damage due to the compression.

The author concludes that the observations up to the present point to the existence of compression but that it is not yet possible to determine the kind, the cause and the location of the compression.

Compression is considered present when there is an increase of the albuminous constituents of the spinal fluid with xanthochromia.

3. *Changes in the Liver and the Pigmentation in Pseudosclerosis.*—The author's investigations on certain of the pathological features of the cases of pseudosclerosis with pigmentation, reported in 1912 by Fleischer, show certain variations from those presented by him. These concern first the pigment and secondly the alterations in the liver. Silver was found in the pigment in contradistinction to the investigation of Fleischer. The alterations in the liver resembled those of ordinary sclerosis. There was a lack of round-cell infiltration, the peri-portal connective tissue was poor in nuclei, there was a lack of the proliferative phenomena on the part of the biliary ducts and the liver parenchyma. The changes in the liver did not resemble those of a healed sclerosis but of a cured acute atrophy of the liver. The structure of the liver as found on section resembled that of a normal liver at an early stage of embryologic development.

The author thus groups the published cases:

1. Those with argyrosis and without alterations in the brain and spinal cord.
2. Those without argyrosis and without alterations in the brain and spinal cord.
3. Those with argyrosis but with alterations in the brain and spinal cord; these cases do not, however, show the picture of multiple sclerosis.

It is probable that the general constitutional symptoms, the pseudo-

nervous symptoms and the eventual argyrosis depend upon the primary alterations in the liver. The functional insufficiency of the liver as occasioned by its faulty structural development, leads to disturbances of the functions of the various organs of the body, disturbances of metabolism and to auto-intoxications. It is probable that the silver was introduced into the organism through the gastro-intestinal tract, possibly with the food.

It appeared that the disturbances in the development of the liver were due to congenital lues. In the cases of pseudosclerosis without structural alterations in the liver, disturbances of the liver may be of hepatogenic origin.

4. *Metastatic Adenoma Causing Compression Myelitis.*—Jacobaeus reports the case of a man 40 years old, who fourteen years previously had had a tumor removed from the throat. Present illness began ten months before admission with symptoms of motor irritation. There was diminution of tactile sensation in both lower extremities and over a part of the abdomen. Gradually, the patient began to experience loss of power especially in the right leg and this was associated with a sensation of stiffness. Four months after this a girdle sensation was felt at the level of the navel and this persisted. Disturbances of the bladder and rectum developed but there was no sexual impotence. These symptoms gradually became worse. A month previous, the patient had noticed a small lump about the size of a walnut in the throat, circumscribed, freely movable, rather hard in consistency and following the movements of the larynx. A cutting pain between the shoulder blades was now experienced. The cranial nerves and brain were apparently normal. A slight tenderness over the spinous process of the second thoracic vertebra with rather uncertain dullness upon percussion. Rigidity affecting the muscles of the abdomen. Normal electric irritability. Romberg's sign present. Markedly exaggerated reflexes of the lower extremities. Reflexes of the upper extremities normal. X-ray examination of the vertebræ showed a partial displacement of the third thoracic vertebra. No luetic history. A tumor of the vertebra was diagnosed after excluding the following conditions: Caries of the vertebra, syphilis and tuberculosis. At this location, carcinoma or sarcoma seemed unlikely. A metastatic growth from the thyroid tumor was thought possible.

Of these metastases of thyroid tumors, about 25 or 26 are reported. Compression myelitis from involvement of the vertebral column was observed in 5 cases. A small piece of the bone marrow was removed by an entirely new method.

It was not possible to entirely rule out tuberculosis as a general reaction followed the administration of tuberculin.

5. *Paralysis of Accommodation.*—The author ascribes post-diphtheritic paralysis of accommodation to muscular weakness according with his law, that those muscles or muscle groups become paralyzed the most rapidly and most completely, and recover the most slowly and to the least extent, that possess the least power (as expressed by the weight of the muscle), and that carry on their functional work under the least favorable physical, physiological and anatomical conditions. He adduces in favor of his contention the fact that the paralysis usually starts in four weeks after the primary affection, at a time when the children resume their reading, that the affection occurs almost exclusively in hypermetropics in whom the strain on the ciliary muscle is especially great, that it also may occur in

hypermetropic adults and in convalescence from other infectious causes, such as measles and scarlet fever.

6. *Myxedematous Idiocy*.—Goldstein attributes the condition in these cases to a disturbance of development, affecting the brain and also the glands of internal secretion especially the testicles, thyroid and pituitary. The disturbance of the brain determined the idiocy, that of the glands of internal secretion the myxedema. One of the cases had been previously reported by Hilbert. It was that of a boy 10½ years old who showed marked lack of intelligence, small for his age with a relatively large head. The mouth remained open, the lower part of the face, as well as the eyelids, were swollen. The neck was short and thick and the thyroid not palpable. The arms and hands were myxedematous. After death the thyroid was found not to vary much from normal except that the follicles varied much in size and embryonal glandular tissue was liberally present.

The 16-year-old brother of this patient was affected with idiocy and had cretinoid characteristics. Marked stunting of growth. The skin was swollen and in places firmly adherent; atrophy of the genitalia, lack of growth of hair; thyroid not distinctly palpable. X-ray showed an arrest of ossification, especially of the carpal bones.

At autopsy the thyroid was small and, except for an abnormal amount of colloid, relatively speaking, normal. The testicles showed, microscopically relatively few lobules lined with a single layer of epithelium and no evidence of spermatogenesis. The pituitary and adrenals were very small. There were present none of the characteristics of mongolism.

The brain was of relatively high weight. The cortical layers were disarranged and in places there were fewer ganglion cells than in normal; in other places they were abnormally abundant. Many of the cells were oval with few processes and contained but a small amount of chromatin; the nuclei were abnormal in size and structure. The chromatin bodies were partly gathered together and partly disintegrated.

7. *Subarachnoidal Hemorrhage*.—Forsheim reports a case in which the diagnosis was made before spinal puncture, and in which the increased pressure of the cerebrospinal fluid was directly measured. He believes this to be the first case of the kind in which there was actual measurement of the pressure. On account of the slight admixture of the fluid with blood, the author infers that the increase in tension is due, not so much to the presence of the added amount of blood, as to the secondary secretion of cerebrospinal fluid. The puncture is regarded to have been of therapeutic value.

The case was that of a servant girl, 20 years old, who experienced a cutting pain in the back of the neck and which radiated toward the occiput. She screamed and fell but was not unconscious. She vomited and for several days was somewhat dull and somnolent and complained of pain in head and neck. The head was bent backward with resistance upon forward flexion and with tenderness over the cervical vertebræ. A bilateral Kernig-Lasègue sign; no Babinski and knee-jerks normal. A day later, lumbar puncture showed the pressure to be 330 mm. The fluid was uniformly mixed with blood and showed no clots. About 20 c.c. of fluid was withdrawn. The following day the pressure was 220 mm. The case progressed to complete recovery.

8. *Relapses of Traumatic Neuroses*.—This author maintains that we can speak of a "cure" of a traumatic neurosis in the same sense that we speak of the cure of a non-traumatic neurosis, *i. e.*, there may be a dis-

appearance of symptoms with the return of the individual's working capacity. Wimmer reports 8 cases which he divides into two groups: (1) traumatic (local) hysteria and (2) traumatic general neurosis. In the former condition the relapse may affect another portion of the body than that affected primarily. In all cases the patients suffered new accidents before the relapses.

YAWGER (Philadelphia).

Monatsschrift für Psychiatrie und Neurologie

(Vol. 33, April, 1913, No. 4)

1. Meningitis Serosa. L. E. BREGMAN and G. KRUKOWSKI.
2. Cephalalgia and Hemicrania Psychosis. A. ROMAGNA-MANOJA.
3. Suicide in Traumatic Cases.
4. Arteriosclerosis, Late Paresis and Trauma. C. LAMPE.
5. The Relationship of Compulsory Ideas to Manic Depressive. K. BONHOEFFER.

1. *Meningitis Serosa*.—Several cases from the authors' experience are described, including one which resulted from psychic shock. The only other similar case was one reported by Nonne. In chronic cases, choked disc and optic neuritis were the rule. In the acute cases the fundus was sometimes affected, sometimes not. The condition seemed to have no bearing on the prognosis. An unusual optical symptom is bi-temporal hemianopsia, resulting from distention of the third ventricle with fluid.

2. *Cephalalgia Psychoses*.—Four cases are described in which during prolonged attacks of cephalalgia or hemicrania the sufferers developed a psychosis consisting of excitements and hallucinations with some confusion, often suicidal attempts. The psychotic symptoms were proportionate in severity to the headache. A review of the cases, and other similar reported cases, shows that they are rather uncommon, that the mental symptoms seem to be directly due to the pain. There was frequently an underlying psychopathic constitution but never any physical or mental signs of hysteria or epilepsy.

3. *Suicide after Trauma*.—Although persons with traumatic psychosis often express themselves as tired of life and longing to die, and although they often threaten suicide, they seldom make attempts on their own lives. The suicidal cases are more often among the married, probably on account of depression over the family which is without support. Age seems not to be a factor. The interval between trauma and suicide is usually 1–2 years. The great majority of the cases are of hypochondriacal depression. It is very unlikely that trauma alone without any endogenous factor can lead to the suicide.

4. *Arteriosclerosis, Late Paresis and Trauma*.—The relationship of these three conditions is discussed at length and a case described. A man of 64 years, after presenting slight mental symptoms referable to cerebral arteriosclerosis for a period of ten years, suffered an accident with head-injury and six months later developed paresis which ran a typical and rapid course. Autopsy showed both well-marked arteriosclerotic changes and typical parietic alterations. The case shows that the typical expansive form of paresis may occur after the age of sixty and that even a very old brain with advanced arteriosclerosis is still capable of marked infiltration and exudative reaction. Also that a combination of arteriosclerosis and paresis is possible with the former existing for many years before the occurrence

of the latter. The syphilitic infection in the case had occurred forty years before the onset of paresis. The relationship of the outbreak of paresis to the head-injury was quite conspicuous.

5. *Compulsory Ideas*.—After presenting a brief case-record illustrating his point, the author points out the similarities between the occurrence of compulsory ideas and manic depressive insanity. The frequent periodicity of the former had already been noted by several other observers. That they do not bear a causal relation one to the other is easily shown by the author. There are many things which point to their close nosological relationship. Probably chief among these is the occurrence of definite manic manifestations during the course of the condition. Another important point is the frequency of manic-depressive in the antecedents.

(Vol. 33, May 1913, No. 5)

1. Contribution to the Study of Dysmegalopsia. O. SITTING.
2. The Anatomical Findings in a Case of Multiple Sclerosis Treated by Förster's Operation, with Remarks on the Histology of Multiple Sclerosis. P. SCHUSTER.
3. Disorders of the Hypophysis. A. PERITZ.
4. The Diagnostic Significance of the Ganzer Symptom. G. HAENISCH.

1. *Dysmegalopsia*.—Four cases of this uncommon disorder were observed. Fisher has previously made interesting studies of the condition and differentiated two forms—one due to an affection of the projection center concerned, which he calls "cortical" dysmegalopsia and which follows anatomo-physiological laws—the other, a psychic disorder, usually of an hysterical nature which he calls "transcortical" (in the Wernicke sense). Fisher differentiated the two forms by the fact that hallucinations in the former were not dysmegalopic while in the latter they were. The four cases of Sittig were all of the transcortical type. Three were hystericals, one an alcoholic. In the last the disturbance lasted only a few hours. The following are some of the deductions made: Hysterical dysmegalopsia may be unilateral. It may be combined with a similar disturbance in touch sense. Macropsia may be associated with macrographia instead of the reverse as occurs in the cortical form. In unilateral cases the interaction of the normal with the dysmegalopic side may make objects seen with both eyes appear normal. In which case the individual is not conscious of the difficulty until one eye is covered. Or the disorder may be just as great with both eyes open or the image may appear distorted. In transcortical dysmegalopsia the writing done with eyes closed is not normal, but altered in size as with eyes open. This is a differential point from the cortical forms.

2. *Anatomical Findings after Förster's Operation*.—A woman of 33 suffered from multiple sclerosis, the chief symptoms being in the trunk and lower extremities. She was bedridden; treatment including mercury had been useless. Although five cases out of six which had been operated upon by Förster had died, the patient was anxious to have it tried. The second, third and fifth lumbar and first sacral posterior roots were cut on both sides. Death occurred seven days after the operation. The terminal symptoms were of pneumonia and meningeal involvement. The chief anatomical interests in the case lay in the effect of division of the posterior roots upon the anterior horn cells. Opinions on this point had hitherto been conflicting and not convincing. Nissl preparations from the segments

of which the posterior roots had been divided showed a variable number (approximately a tenth) to be affected by acute change. Some showed simple chromatolysis, others were swollen and the nucleus displaced or destroyed. Aside from these nearly all the anterior horn cells of the lumbar and sacral segments were quite normal. It was remarkable that all the anterior horn cells at all levels of the cord contained excessive pigment. Another important observation was that the acutely degenerated were not found in one location but scattered. Those in the postero-lateral group, which is associated with the posterior roots, were never involved. The findings in the Marchi, Weigert and Bielschowsky specimens were much as have been found previously in multiple sclerosis. There were plaques of sclerosis and myelin-sheath degeneration in several places in the cord. The neuroglia was always more involved than the nervous substance and was often increased without affection of the parenchyma while the latter was never found alone affected. The author is convinced that the lesions in multiple sclerosis are primary neuroglia increase and not reparative processes as held by the Vienna school. The very high mortality resulting from Förster's operation upon cases of multiple sclerosis would make it seem as though the sclerotic cord possessed some vulnerability to such interference. So far, of seven cases operated upon, six have died. The article is well illustrated with photo-micrographs and drawings in color.

3. *Disorder of Hypophysis*.—Our knowledge of the clinical manifestations of hypophysis disease has been considerably added to in recent years. We have learned, for instance, that acromegaly is due to a hyperfunction of the gland instead of a hypofunction as at first supposed, since the tumors which are found are usually benign adenomata. The relative importance of the anterior and posterior lobes and pars intermedia are now pretty clearly understood. The author sums up the symptoms in the form of a schema as follows: Hypofunction of the anterior lobe produces dwarfism; hyperfunction, acromegaly and gigantism. Hypofunction of the posterior lobe produces characteristic adiposity; hyperfunction, diabetes, insipidus (?). Increased function of the anterior lobe plus lessened function of the posterior lobe produces acromegaly with adiposity; lessened function of the whole hypophysis produces dwarfism and adiposity. Combined disease of hypophysis and testicles produces eunuchoidism. Disease of all glands with internal secretion, the pluriglandular disease of Claude and Gougerot, produces partial gigantism. There are many details, however, which are not yet clear and many apparent contradictions to be explained. One of the chief of these concerns the interaction between the pituitary body and the testicles. We know that hypersecretion of the anterior lobe is accompanied by atrophy of the testicles and loss of sexual function. We also know that after castration there is an enlargement of the pituitary. One would expect from these facts that upon removal of the hypophysis there would be an exaggeration of the genital function but this does not occur. On the contrary the testicles always atrophy. The author gives the various explanations for this phenomenon which have been advanced and his objection to them. His own opinion is that the posterior lobe of the hypophysis and the testicles have internal secretions upon which they are mutually interdependent but that the secretion of anterior lobe has an antagonistic action to that of the posterior, which would offer adequate explanation. It is apparent from the author's case that disturbance of sexual function is neither so frequent nor so early a symptom of acromegaly as has been taught. Some observations on the

varieties of distribution of adipose in different forms of hypophyseal disease are given and finally a discussion of pluriglandular disease. The article is illustrated by photographs and by Roentgenograms.

4. *Ganser Symptom*.—Ganser maintained that the symptom described by him was part of an hysterical dream-state and if it occurred in cata-tonia was due to an admixture of hysteria. Stertz has described the symptom in cases of "pseudo-dementia" without disturbance of consciousness. The author describes three cases of organic mental disorders in which suggestive hysterical symptoms including the Ganser symptom were present. The question whether such cases should be called organic disease plus hysteria or simply hysterical manifestations in the course of organic disease is discussed at some length.

(Vol. 33, June, 1913, No. 6)

1. Further Contributions to the Diagnosis and Differential Diagnosis of Tumor Medullæ Spinalis. H. OPPENHEIM.
2. Apraxia with Lesion of Corpus Callosum. E. FORSTER.
3. Intelligence Test with Abnormal Children. F. KRAMER.
4. Optic Atrophy with Cerebral Arteriosclerosis. O. KLIENEGER.
5. Lipoids in the Blood Serum in Paresis. Value of the Neumann-Hermann Reaction. L. BENEDCK.

1. *Tumor Spinalis*.—The article is divided into three headings. The first discusses tumor—simulating inflammatory process in the conus and cauda with an illustrative case record. The second deals with a tumor in the upper cervical region with successful operation. The third division consists of a dissertation on hemiplegia spinalis. Spinal hemiplegia is much less common than cerebral hemiplegia and presents a greater variety of symptoms. Except in traumatic cases, it is gradual in onset and the apoplectic insult is lacking. Lesions of the cervical enlargement produce different symptoms according to the segments involved. In typical cases the paralysis of the arm is atrophic, that of the leg is spastic. But this is not present in all cases. When the lesion involves the eighth cervical and first dorsal segments there is atrophic paralysis of the small hand muscles and triceps, the triceps reflex is lost while those of the supinators and pronators are preserved, there are pupillary symptoms and spastic paralysis of the leg of the same side. Later there is contralateral anesthesia of leg and buttock, homolateral in the lower arm-roots. Lesions in the fifth and sixth cervical segments produce Erb's upper-arm palsy, loss of the forearm flexor reflexes (instead of which, tapping the styloid process of the radius may cause contraction of the fingers), the triceps reflex is usually increased and the muscles supplied from the lower cervical segments may show spastic weakness. Lesions in the upper half of the cervical enlargement produce hemiplegia resembling the cerebral type in that both arm and leg are spastic. On account of the narrowness of the cord in this location the symptoms are seldom confined to one side. The motor manifestations are the most important. A remarkable type of cases is that in which the spastic paralysis of the extremities is accompanied by paralysis of the diaphragm of the same side. Another peculiarity sometimes occurs in that there is not only spastic paralysis of the extremities but the muscles supplied from above the lesion assume a state of contracture which is quite independent of pyramidal degeneration. The sensory symptoms of course vary greatly in lesions of this region, but they have been so thoroughly

discussed before that the author passes them over with only a few remarks on particular forms. Lesions of the first and second cervical segments give certain characteristics. The phrenic need not be affected, probably because its action is largely reflex and independent of its cortifugal fibers. The cucullaris and sterno-mastoid are paralyzed and atrophic. The trigeminus may be involved with later anesthesia of the face. Little is known of the irritative symptoms of this nerve. Bulbar symptoms sometimes occur and are susceptible of various explanations. They may be due to pressure, edema, circulation disturbance, intoxication or, as in a case cited, in which the symptoms disappeared immediately upon removal of a tumor, to diasthesis in the Monakow sense. The article contains a number of excellent case-records.

2. *Apraxia*.—A case of apraxia resulting from a glioma of the corpus callosum. The distinctive feature of the case was the inability to carry out combined movements from memory (threatening, beckoning, snapping the fingers, etc.) while there was no difficulty in the handling of objects.

The tumor was found to have completely destroyed the corpus callosum at the level of the anterior central gyri and in front thereof while the posterior portion remained intact. The case is taken to indicate that the region anterior to the central gyri is the location of motor memories, and that if the portion of the corpus callosum connecting the supra-marginal gyri is intact the patient can still perform complex movements provided the necessary visual or auditory stimulus is provided such as combing the hair when the comb is furnished. The article is illustrated by photographs.

3. *Intelligence Test*.—One of the difficulties in intelligence tests is the distinguishing of the productive intellectual functions from the simple reproduction from memory. The Binet-Simon system yields most satisfactory results. The author examined a number of defective children by this method and made a number of interesting observations, which, however, do not lend themselves to brief synopsis.

4. *Optic Atrophy*.—This condition is rarely the result of arteriosclerosis alone. The differentiation from optic atrophy due to brain tumor may be important. The absence of pressure symptoms, the very gradual course and the coexistence of symptoms of cerebral arteriosclerosis are points of diagnosis. The nerve is not injured, as one might suppose, in its bony canal, but further back in the fibrous continuation of the canal where the ophthalmic artery may press upon it or where it is crossed by the internal carotid the atrophy begins as a true pressure atrophy with secondary degeneration. Later there are connective tissue and proliferative changes.

5. *Lipoids in Blood*.—The cholesterin-ester in the blood of a large number of cases of paresis is found increased. Beyond this statement the author does not feel justified in making any claims from the results of his examination of a fairly large number of paretics with normal controls.

J. W. MOORE (Matteawan).

Revue Neurologique

(An. XXI, No. 11)

1. Retinitis Pigmentosa with Optic Atrophy and Family Cerebellar Ataxia. H. FRENKEL and M. DIDE.
2. Reversal of the Reflex of the Radius Due to Traumatic Lesions of the Sixth Cervical Root. S. RICCA.
3. Hematoma of the Ear and Serous Effusion in the Auricle of the Ear. BOUCHAUD.

1. *Retinitis Pigmentosa and Family Cerebellar Ataxia*.—Three sisters were successively affected with pigmentary retinitis, optic atrophy, mental deterioration in the form of an acquired infantilism, asynergia and other cerebellar symptoms, and convulsions. The authors compare these cases with cases of amaurotic family idiocy, hereditary cerebellar ataxia, etc., and find differences which will not permit of their classification with these and they conclude that they represent an acquired dystrophy of the nerve cells in many parts of the central nervous system and in the retina.

2. *Inversion of the Reflex of the Radius*.—A case of subluxation of the 5th cervical vertebra forward on the 6th. In the right arm the reflexes were normal. In the left arm there was general weakness with the paresis most marked in the deltoid; abolition of the biceps reflex with sometimes a tricep contraction on tapping the biceps tendon; and an inversion of the reflex of the radius. The triceps reflex was normal. The authors diagnosed a spinal cord contusion from the history of the case, of which the symptoms were transient, and a more serious lesion of the sixth cervical nerve root.

3. *Hematoma of the Ear*.—Report of a case in a patient with general paralysis. Posteriorly the ear appeared normal but anteriorly there was a soft, fluctuating tumor arising from the helix and not involving the anti-helix or concha. It was transparent to light and on puncturing gave a clear, serous fluid with few small blood clots. An incision and evacuation of its contents resulted in a complete cure. The author suggests the name hydroma for such cases; properly treated by prompt incision, etc., there is complete recovery, whereas in hematoma there is usually some deformity as a result. If a hydroma is neglected it becomes inflamed, the contents become sanguinolent and deformity results.

(An. XXI, No. 12)

1. Contribution to the Polyglandular Syndrome. Diabetes. Tumor of the Hypophysis and Infantilism. P. SAINTON and L. ROL.
2. The Sign of the Forearm (Sign of Leri) in Mental Diseases. LIVET, MORAL and PUILLET.
3. Thirty Cases of Incomplete Forms of Basedow's Disease or Vasomotor Neurosis. L. ALQUIER.

1. *Tumor of the Hypophysis*.—A patient aged twenty years began to suffer at the age of sixteen years with a juvenile diabetes. Her appetite was enormous; her thirst violent; and she became weak and thin. The urine contained 96 grams of sugar per liter and she passed about three liters in 24 hours. These symptoms persisted. Examination showed: an infantile appearance; atrophy of the thyroid; the hair was harsh and dry; the upper part of the face had a myxedematous appearance. She complained of violent headache and had attacks of narcolepsy. There was a bitemporal hemianopsia and an X-ray plate showed considerable enlargement of the sella turcica. The weakness gradually grew more pronounced and the patient died in a terminal coma a month after this examination. There was no necropsy.

2. *Sign of Leri in Mental Disease*.—The authors conclude that the sign of Leri is negative, or pathologic, in dementia præcox and idiocy; it is positive in general paralysis of the insane and in maniac depressive insanity.

3. *Basedow's Disease*.—Largely statistics of the symptoms present in these cases. In all of them the vasomotor disturbance and the cardio-

vascular instability would especially attract attention. The heart is particularly excitable

(An. XXI, No. 13)

1. Lesions of the Thyroid Body and Basedow's Disease. ROUSSEY ET JEAN CLUNET.
2. The Contralateral Tendon and Periosteal Reflexes and Associated Movements. NOÏCA.

1. *Lesions of the Thyroid Body*.—The author examined the thyroid gland from five cases of Basedow's disease, two of thyroid enlargement with Basedow's symptoms, and two cases with cancer of the thyroid gland also with Basedow's syndrome, and concludes that in Basedow's disease there exists a histologic modification of the thyroid consisting of an increase in the number and size of the glandular lobules. The epithelium becomes more columnar and there is an increase in lymphoid elements. The colloid in the gland contains less iodide than normal.

2. *Contralateral Reflexes and Associated Movements*.—In cases where a lesion affects the upper motor neurone supplying one side of the body, the reflex activity of that side is greatly increased. Stimuli applied to the unaffected side, either tendon or periosteal, cause contralateral reflexes because their is an irradiation to the opposite side and it is overactive. Voluntary motor stimuli to the sound side also affect the opposite side in the same way. The causes of associated movements and contralateral reflexes are analogous.

(An. XXI, No. 14)

1. Aran-Duchenne Muscular Atrophy Consecutive to a Diffuse Meningomyelitis. A. SOUQUES ET A. BARBÉ.
2. Contribution to the Study of Cerebrospinal Syphilis. MME. NATHALIE ZYLBERLAST.

1. *Aran-Duchenne Muscular Atrophy*.—Clinically, there was an amyotrophy of the type of Aran-Duchenne with symptoms of combined sclerosis. Histological examination showed that the atrophy was due to a pseudo-systemic anterior poliomyelitis with diffuse vascular and meningeal lesions due to syphilis.

2. *Cerebrospinal Syphilis*.—A case diagnosed, clinically, as cerebral syphilis showed at autopsy a gumma located in the left parietal lobe and also a gumma compressing the spinal cord at the level of the fifth dorsal segment. The only spinal cord symptoms were pains about the body and diminution of the knee jerk on the right side. There was no Babinski reflex. The relatively few symptoms shows the great tolerance of the nervous system to compression.

(An. XXI, No. 15)

1. A Case of Partial, Continuous Epilepsy. MADAME LONG-LANDRY and QUERCY.
2. Subacute Encephalitis in a Boy of Nine Years. KOELICHEN and SKODOWSKI.

1. *Partial, Continuous Epilepsy*.—The patient was thirty-four years old and had a paraplegia due to Pott's disease. He also had attacks of Jacksonian epilepsy affecting the right arm. The right arm showed a flaccid paralysis with loss of the tendon reflexes. In the intervals between attacks there were clonic movements of the fingers at the rate of three to six per second. The author diagnosed, clinically, a tubercle of the brain in the

middle third of the ascending frontal convolution as the cause of the epileptic seizures and clonic movements.

2. *Subacute Encephalitis*.—The first symptom noticed was a nasal speech, about a week later there developed some difficulty in the use of the right hand. Examination showed bilateral facial weakness and paralysis of the soft palate and vocal cords. The right upper extremity was paralyzed, the left was normal. The tendon reflexes in both the upper and lower extremities were normal. There was a positive Babinski reflex on the right side. Ten days later the right leg also was weak. Following the rupture of a pharyngeal abscess the symptoms slowly receded and the patient slowly returned to normal. There was at no time fever or headache. The authors diagnosed, clinically, encephalitis in both cerebral hemispheres, unusual because of its slow development.

(An. XXI, No. 16)

Report of the Congress of Alienists and Neurologists of France, Meeting at LePuy, Aug. 1-6, 1913.

1st Report. Disturbance of Movement in Dementia Praecox. LUCIAN LA GRIFFE.

2d Report. The Anesthesias in Cerebral Hemiplegia. MONIER-VINARD.

3d Report. Indications for Operation in the Insane from the Therapeutic and Medico-legal Point of View. LUCIUS PICQUE.

1. *Disturbance of Movements in Dementia Praecox*.—They are divided into disturbances of expression: mimicry, attitude, gesture, etc. Disturbances of function: paralyzes, tremor, tics, convulsions, catalepsy, and contractures. Disturbance in unconscious movements, such as those of respiration and peristalsis.

2. *Anesthesias of Cerebral Origin*.—The author relates the similarities and differences in the types and distribution of the sensory changes due to cortical and thalamic lesions as described by Head and Holmes and by Roussey, respectively.

3. *Operations for Insanity*.—Some peripheral lesions and latent infections may lead to mental confusion or be the basis for hypochondriacal delusions. In general, operations for the cure of insanity are useless and dangerous.

(An. XXI, No. 17)

1. Contribution to the Study of Facial Bispasm and Facial Hemispasm Alternans Combined with Arteriosclerotic Epilepsy and a Pseudo-Parkinson Mesencephalic Syndrome. W. STERLING.

2. The Physico-Chemical Composition of the Cerebrospinal Fluid in Epileptics. THABUS and BARBÉ.

3. Spinal Sciatica. J. M. RAÏMISTE.

1. *Facial Bispasm and Facial Hemispasm*.—In the first case the spasm was noticed by the patient on the right side of the face. At the time of examination he had facial spasm on both sides, synchronously. On the right side the entire face was affected; on the left side, only those muscles about the eyes. They had all the features of true facial spasms and persisted during sleep. In the second case, spasms of the left side of the face followed a right hemiplegia. About six months later the patient had a series of generalized epileptic seizures and after this the contractions of the left side of the face completely disappeared. The appearance of the patient, his gait and a rhythmic tremor of the trunk, thighs, and head suggested a resemblance to paralysis agitans.

2. *Composition of the Cerebrospinal fluid in Epilepsy.*—Physico-chemical examination of the fluid from ten cases given in detail. It is concluded that the density is slightly increased but the freezing point is about the same as the normal. Albumin and extractive are slightly diminished in quantity while chlorides and ash are increased as compared to the normal. Phosphate is the same as in the normal but the amount of glucose is diminished and it may be absent (one case).

3. *Spinal Sciatica.*—Four cases are reported in which there was pain in the posterior aspect of the thigh, tenderness on pressure over the sciatic nerve, Lasègue sign, etc., with increased tendon reflexes and slight sensory changes. Lumbar puncture showed the spinal fluid under increased pressure and with a positive Nonne-Apelt reaction. The patients were cured by the lumbar puncture in from one to five days. Cases of lumbar pain and pains in the anterior aspect of the thigh were cured in the same way. The author makes the diagnosis of meningo-myelitis in these cases.

C. D. CAMP (Ann Arbor).

Book Reviews

HANDBUCH DER PSYCHIATRIE. Herausgegeben von Prof. Dr. G. Aschaffenburg in Cöln. Allgemeiner Teil. 4 Abth. Geschichte der Psychiatrie. Von Pr. Dr. Th. Kirchoff. Allgemeine Therapie der Psychosen. Dr. A. Gross. F. Deuticke.

This installment of the "Handbook of Psychiatry" is disappointing. Kirchoff's section on the history, consisting of 48 pages, is a very much abbreviated account which hardly does justice to the subject. It patterns closely after the models set in the larger handbooks of the history of medicine and misses much that is of interest to the student of the history of psychiatry, yet it is a polished account of some of the more striking landmark in the science. Kirchoff maintains his earlier taken position that paresis was probably known in classical times, misquoting, we think, Monkmöller as a partisan of this opinion. The evidence of Prasch and Sudhoff which he also utilizes relative to the appearance of syphilis is we think of little avail. Kirchoff, however, takes a less positive stand relative to this question than he did in a recent journal communication.

The work is particularly disappointing in that little account is paid to the psychiatry of other countries. French psychiatry hardly exists. Griesinger marks the boundary of the recent advance. Altogether a great opportunity has been lost. Monkmöller or some younger historian should have been chosen for this really very important chapter which should have traced the development of psychiatric ideas.

The general discussion of therapy of the psychoses might better have been omitted. Such a chapter in a handbook of any other group of diseases of such varying etiology would be deemed absurd. A chapter on the general therapy of lung disease for instance, general therapy of bone diseases, as though actinomycosis and influenza could be therapeutically allied or a broken bone and an osteomyelitis had any general therapy. Of what value is a discussion of heredity as a prophylactic measure in paresis. Syphilis is the factor. This general portion in our text books of psychiatry should be omitted. They are apt to be confusing as the tendency is to regard all mental disorders as one.

These general therapeutic notes are as good as most are but they cannot be very sound. Take the treatment of excitement as a symptom, as an example. No modern psychiatrist would deal with it as a unit, any more than a modern internist would consider hemoptysis a unit. No intelligent work on internal medicine gives a general treatment of hemoptysis, which may be due to a tricuspid regurgitation or to a tuberculous hemorrhage or what not. Thus the excitement of a paretic, a manic, or a precox needs entirely different methods of approach. Only one who has the superficial idea that excitement is to be handled as such independent of causative factors can fail to grasp this notion. This the author has not emphasized. Much time is wasted on problems of asylum architecture. This is not the problem of treatment of psychoses.

The discussion on psychotherapy illustrates the feature just mentioned. The author quotes approvingly Strümpell-Anton's remarks concerning

psychoanalysis in the psychoses without there appearing an iota of an idea as for what one may use psychoanalysis, a brain tumor, paresis, acute infectious delirium or what. This is all very inconsequential. Words, without the vestige of an idea. Thus the same with walks and talks and Dubois and Dejerine's methods. There is absolutely no indication as to the uses to which they should be put. The middle age writers discussed the value of mercury, arsenic, china, etc., for fever. Reading this discussion of Gross' puts the reader in mind of this very antique mode of approach. When will an editor have the courage and the sense to omit "General Therapeutics" in a system of this kind?

JELLIFFE.

THE SIGNIFICANCE OF ANCIENT RELIGIONS IN RELATION TO HUMAN EVOLUTION AND BRAIN DEVELOPMENT. By E. Noel Reichardt. Dodd, Mead & Co., New York.

In this book the author has attempted to give "the true perspective of the evolutionary movement" by a study of the great racial movements into which ancient and modern history have been divided, and to do this he tries to show that the natural development of the race and its concomitant advance of civilization has been overshadowed and interfered with by a cosmic influence, which he calls the generic wave. It started from a definite stimulation of the germ plasm and carries with it the great racial movements which are distinguished by the rise and decline of great religious movements down to the present day. The evolutionary result of this generic wave has been the development of a new brain structure, a new mind-organ, which being at first without contact with the material world was entirely subjective and so produced the intense subjectivity of the ancient or archaic religions. Only with the beginning of the second or modern phase of the generic wave did this new mind-organ become connected with the external world and develop into the organ we now possess; and which brings us into relation with the objective world of nature. The attempt to explain the rise and development of this subjective mind-organ and its gradual ascendancy of the Neo-andric ganglia composing it over the pre-existing Paleogynic organ preceding it inherited from a savage state in which the female bore the developmental power of the race can hardly make this book of serious value to those acquainted with the results of modern research into the structures of the brain.

The book loses its value at the very outset by its placing result for cause, the putting of the cart before the horse. To assume that the races affected by this generic movement degenerated from highly civilized and moral communities into races governed by lust and passion as a result of the subjective religions developed in them by the formation of the isolated mind-organ is not compatible with the facts revealed to the careful student of the development of mankind. Nor is the condition of the savage world adequately explained by assuming it to be a degeneracy caused by the hostile contact of the ancient historical races and the weakening effect of widespread sexual transfusion.

The growth and decay of the ancient religions is discussed at length as well as the religious movements of the modern world and the bearing of this theory of evolutionary development upon the problems of morbid psychology, but the author's point of view and unscientific premises destroy the value of the discussions.

DIE PSYCHOANALYTISCHE METHODE. EINE ERFAHRUNGSWISSENSCHAFTLICH-SYSTEMATISCHE DARSTELLUNG. By Oskar Pfister. Julius Klinkhardt, Leipzig and Berlin, 1913. Price M. 12.50.

This monograph, which is the first volume of a new series ("Pädagogium—Eine Methoden-Sammlung für Unterricht. Unter Mitwirkung," von Prof. Dr. E. Meumann. Herausgegeben von Prof. Dr. Oskar Messmer), deals essentially with psychoanalysis in its relation to pedagogy. It is interesting to note in passing that its author was the first to introduce psychoanalysis into religious and pedagogic circles.

The author gives a very clear and comprehensive presentation of the subject in such a form that Freud's psychology is made available for the pedagogue and minister, for whom the book is specially designed. The psychoanalytic works hitherto published have been couched in such language that in most cases they are easily comprehensible only by those trained in the technicalities of medico-psychology, and this volume is a very welcome addition to the literature, useful to the general practitioner as well as to the layman.

KARPAS.

THE TUDOR SHAKESPEARE, Published by The Macmillan Co., New York, at .25 per volume.

Hitherto our pocket Shakespeares have been prepared, either for the school boy, with notes and glossary that suggest forthcoming examinations, or for the libraries *de luxe* with soft padded covers and a box to protect the gilt edges; but the Tudor Shakespeare possesses the charm of both without being pedantic, or over luxurious. It is a neat, well bound, beautifully printed set of books, that is a delight to look at in an inviting row or to take to the play.

Each volume has come from the study table of a professor of English of some one of our American colleges or universities. There must have been a regular Round Robin intimacy between all these clever men and women to produce such a Shakespeare lover's Shakespeare.

It leads the reader companionably into the past to the early performances of each play, and introduces him to the actors whose names are forever great through their interpretations of the play. The little red letter headings of the introduction to each play, such as *The Date of Composition, Stage History, Interpretation*, are little signboards to the road of long ago, on which one sees the quaint and monstrous costumes and hears tales of forgotten customs and usage, and mingles with enthusiastic audiences that rise from their dust to applaud the great tragedians of other centuries.

One begins to be aware that Shakespeare has always been a presence on that road, introducing one generation to another, the medium not only of culture but of the very language of the race. He has been the one continuous Idea of literature.

Dr. William Allen Neilson, of Harvard, and Dr. Ashley Horace Thorndike, of Columbia University, are the editors of this edition; and it is their happy idea to set our American men and women of letters at this interesting task of minting the wealth of wit that the centuries have contributed to the Cult of this Continuous Idea.

When it is a well known play that reads itself, the foreword enriches and enlarges an old conception of it—when it is a seldom read play, the foreword stimulates us to see in it the ideas that made it beloved of our forbears.

The glossary is no involved root extracting affair, but as simple and straightforward as a number in a telephone book. The notes tell us what we want to, and not merely what we ought to know. For this reason it is a better edition for schools than some in use, and a more delightful than the more strenuously erudite. A glance at the cover lining with its brave English folk strolling through a tower embattled landscape, and its galleons putting off to sea on the sky line, and the title page bordered with masks mingled with Tudor roses gives us the sense, as we slip a volume in our pocket, that the suburban train, or the subway is a fascinating place in which to spend a half hour.

JELLIFFE.

LE SPLEEN. CONTRIBUTION À L'ETUDE DES PERVERSIONS DE L'INSTINCT DE CONSERVATION. Par le Docteur Henry le Savoureux. G. Steinheil, Paris.

Doctor Savoureux has here given an excellent discussion of an old problem of psychiatry which has largely dropped out of mind since more attention has been given to psychotic pictures and less to individual symptoms.

Ennui and the *tædium vitæ* have been of late more and more affiliated with other group phenomena as parts of more general reactions. The present analysis would give a more detailed account of pure cases of a morbid ennui of life leading to suicide.

He speaks of it as a mode of alteration of the instinct of self-preservation. A defect along the motor element gives rise to a neurasthenia, of the affective side to "spleen."

DAS PROBLEM DES SCHLAFS. Dr. Ernst Trömmel. Wiesbaden, Verlag J. F. Bergman, 1912. 2.80 marks.

In this monograph Trömmel presents a complete treatise on sleep. He discusses various theoretical conceptions and rejects the biologic theory of sleep. Although he admits the psychologic relationship between hypnosis and sleep, nevertheless he believes that the center of sleep is in the optic thalamus.

KARPAS.

DIE NERVÖSEN ERKRANKUNGEN DER TABAKRAUCHER. Von Prof. Dr. L. v. Frankl-Hochwart. Alfred Hölder, Wien u. Leipzig.

This short monograph of 90 pages appears as one of the supplement volumes to Nothnagel's series. It is based upon a study of about 1,500 smokers. Those who use tobacco as snuff or as chewers did not come under the author's observations. Most of the individuals studied were from private practice.

Frankl-Hochwart distinguishes cerebral, spinal and somatic types of disorder dependent upon tobacco-smoking and this monograph is devoted to their description. In general he makes out a strong case against tobacco, although it does not appear that it is definitely proven.

UEBER SYMPTOMATOLOGIE, WESEN UND THERAPIE DER HEMIPLEGISCHEN LÄHMUNG. Von Dr. Wm. Gierlich. Wiesbaden, Verlag J. F. Bergman, 1913. 4.60 marks.

The subject of the symptomatology, nature and therapy of hemiplegic paralysis is exhaustively treated by the author. The book is divided into

four chapters: Motor Conducting Path in Men; Symptomatology of Hemiplegia in Men; The Nature of the Residual Hemiplegic Paralysis in Men; and Therapy. In the third chapter, the comparative physiology and anatomy of the cortical center which is involved in hemiplegic disturbances is clearly presented in the light of modern research.

KARPAS.

A CLINICAL MANUAL OF MENTAL DISEASES. By Francis X. Dercum, M.D., Ph.D. W. B. Saunders Company, Philadelphia and London.

Dr. Dercum has compressed within 400 pages a great deal of descriptive psychiatry. He groups the various psychotic pictures, for which he still retains the Galenic term, Insanity, under five general categories: (1) Delirium, Confusion and Stupor; (2) Melancholia-Mania; (3) Heboid-paranoid; (4) Neurasthenic-Neuropathic, and (5) Dementia are his five classificatory principles. These are all taken up in Part 1. Part 2 takes up what are called clinical forms related to somatic affections and mental diseases as related to age. A third part contains a short review of some psychological mechanisms. Many of the delineations are unusually clear and will prove of undoubted service to students and general practitioners.

As a short text-book at the descriptive level it will undoubtedly fill a need in the present-day requirements of the average medical student.

Notes and News

A course of special instruction for physicians engaged in psychiatric work will be given at the Psychopathic Hospital at the University of Michigan.

The instruction will be systematically arranged and will extend over a period of four weeks, beginning March 30, and closing April 25, 1914.

The instruction will be given in clinical lectures and conferences, laboratory studies and demonstrations and will be conducted as follows:

1. Clinical Psychiatry—Clinical Lectures, Conferences and Ward Visits. 40 hours. Professor Barrett.

2. Clinical Examination Methods—Didactic Lectures and Laboratory Demonstrations. 9 hours. Dr. Haskell.

3. Serological Diagnosis and Treatment—4 hours. Dr. Haskell and Dr. Ide.

4. Neurological Clinics. 6 hours. Professor Camp.

5. Treatment of Syphilis of the Central Nervous System. 2 hours. Professor Wile.

6. Psychoanalysis and the Psychoneuroses—Clinical Lectures and Conferences. 11 hours. Dr. Reye.

7. Development of the Central Nervous System—Laboratory Lectures and demonstrations. 4 hours. Professor Huber.

8. Anatomy of the Central Nervous System—Laboratory Lectures and Demonstrations. 20 hours. Professor Barrett.

9. Histopathology of Psychiatric Disorders—Laboratory Lectures and Demonstrations. 14 hours. Professor Barrett.

For this course of instruction a fee of \$25.00 will be charged.

Applications should be made at an early date as the number admitted to the course will be limited to fifteen.

Applications and requests for information should be made to the Director of the Psychopathic Hospital, Dr. Albert M. Barrett, Ann Arbor, Mich.

Dr. Richard Dewey has secured the services of Doctor Herbert W. Powers as senior assistant physician. Doctor Dewey continues to reside at the Sanitarium and in active personal charge of the medical service. Doctor Powers comes from seven years successful service at the Kenilworth Sanitarium.

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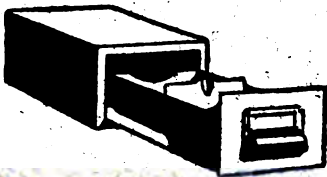
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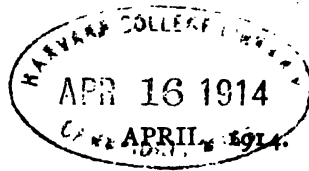
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DR. CHARLES EDWARD SPITZKA.



The Journal OF Nervous and Mental Disease

An American Monthly Journal of Neurology and Psychiatry Founded in 1874

Original Articles

EDWARD CHARLES SPITZKA, M.D.

Dr. Edward Charles Spitzka was born November 10, 1852, at No. 12 Ridge Street, New York City, the son of Charles A. Spitzka, an instrument and watchmaker, and Johanna Tag. He was of Germano-Slavonic origin. He died at his home on January 13, 1914, aged 61 years, 2 months, 3 days. The funeral services at his late residence took place on January 15 and consisted of tributes to the memory of the deceased by Charles P. Fagnani, D. D., a classmate, by Dr. W. B. Pritchard and Dr. N. E. Brill, all life-long friends.

He attended Public School No. 35, then under the direction of Dr. Thomas Hunter. After a collegiate education at the College of the City of New York, he began the study of medicine at the Medical Department of the University of the City of New York, from which he graduated in the year 1873. In addition he obtained an honorary degree from the St. Louis College of Physicians and Surgeons in 1883. After obtaining his first degree, he passed three years in Europe, studying chiefly at Leipsic and Vienna, where he devoted special attention to embryology, brain morphology, psychiatry and diseases of the eye and ear: his principal teachers at the former university being Wagner, v. Coccius, His, Hagen, Wunderlich and Thiersch, and at the latter, Meynert, Politzer, Billroth, Bamberger, Brücke, Arit and Schenk. He served as an assistant to the chair of embryology at the University of Vienna from 1874 to 1875. He entered into general practice in his native city in 1876, occupying among

other positions that of surgeon to the out-door department of Mt. Sinai Hospital and consulting neurologist to the North-Eastern Dispensary and St. Mark's Hospital. He obtained a considerable amount of pathological material from the private and public asylums in and near New York City. The results of the analysis of this material were embodied in an essay on the "Somatic Etiology of Insanity" which gained the prize offered by the British Medico-Psychological Association from the fund presented by W. and S. Tuke in international competition. During the same year (1876) he obtained the prize of the American Neurological Association offered by Dr. Wm. A. Hammond for an essay on Physiological Effects of Strychnia. He has occupied the positions of professor of comparative anatomy in the Columbia Veterinary College; professor of nervous and mental diseases and of medical jurisprudence in the New York Post-Graduate Medical College (1882-'7); consulting neurologist in Sydenham Hospital; president of the American Neurological Society (1890); president of the New York Neurological Society (1883-'4); editor of the *American Journal of Neurology and Psychiatry* (1881-'4); vice-president section of neurology of the 9th International Medical Congress, Washington, 1887; chairman section of somatology, Congress of Arts and Sciences, St. Louis, 1904.

He was a member of the Society of Medical Jurisprudence, New York Academy of Medicine, New York Neurological Society, American Neurological Association, Association of American Anatomists, New York Pathological Society, New York County Medical Society, and honorary fellow of the Chicago Academy of Medicine.

Dr. Spitzka's labors have been chiefly in the direction of the deep anatomy of the brain,—the morbid anatomy of organic diseases of the central nervous system and the classification of mental disorders by clinical methods.

He published a text-book on "Insanity" in 1883 which has been succeeded by two editions of the same. He is the author of the articles on "Chronic Spinal Diseases" and "Cerebral Abscess" in Pepper's "System of Medicine by American Medical Authors," also of "Brain Histology" in Wood's "Reference Handbook."

Among his original discoveries may be mentioned the inter-optic lobes of the iguana, the identification of the hitherto unrecognized post-optic lobes in birds and reptiles, of the spinal course of the cortex lemniscus in man, the marginal tract (discovered a year later by Lissauer) variously referred to as the Lissauer or the Spitzka-Lissauer tract, of the auditory tract in the cetacea and of the superficial decussation of the pyramids in pteropus.

Among his voluminous writings are articles on the clinical features of grave delirium, on race and heredity as related to insanity, the historical rôle of mental disorders, errors regarding the alleged abnormality of criminals, and the legal and biological relations of natural children.

For the last thirty-five years Dr. Spitzka has limited his professional work to the specialty of nervous and mental diseases. He has been frequently called as a medical witness in cases where the mental state of a prisoner in a criminal proceeding or of a testator in civil proceedings was questionable, also in several well-known cases of alleged spinal injury. Notable among the criminal cases was that of Charles J. Guiteau, the assassin of President Garfield, in which Dr. Spitzka's attitude became conspicuous, as both prosecution and defense endeavored to retain his services, but failing, secured his attendance through an attachment. He then testified to the prisoner's insanity, and was the only expert that did so.

Dr. Spitzka was married in 1875 to Catharine Wacek, in the city of Vienna. He is survived by the widow, a brother and a son, Edward Anthony Spitzka, M.D., Director and Professor of Anatomy of the Daniel Baugh Institute of Anatomy of the Jefferson Medical College, Philadelphia.

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A CASE OF AMYOTONIA CONGENITA

By C. C. BELING, M.D.

T. D. Male. Born November 20, 1908, at Newark, N. J. Examined for the first time at the Newark City Hospital on January, 1912.

Family History.—No nervous or mental disorders in either branch. The mother married twice. By her first husband she had one child who is now 19 years of age and in good health; by her second, four children. The first child died two hours after birth; the second, 4 years of age, is healthy and walked at 14 months. Patient is the third child. The last is 16 months old and walks well.

Personal History.—Born at full term, without the aid of instruments, the child was breastfed for $4\frac{1}{2}$ months; he was then weaned and fed on Borden's milk. He took the breast well and there was no difficulty in suckling or swallowing. At birth his feet were said to have been bluish-black in color. Shortly after birth it was noticed that he did not hold his head up like an ordinary child, and that he did not kick or move his lower limbs, which were flabby and loose, in the dorsal position the thighs were always abducted and rotated at the hips and the knees were flexed; he was able to move his hands slightly.

He never crept but always rolled over from one side to the other. At seven months of age his mother made him sit up on a high chair under the impression that this would strengthen his back and make him walk sooner. No doubt this is responsible largely for the present spinal deformity, as the toneless muscles were unable to support the spinal column. He talked at 18 months. Nothing abnormal in his mental development. He has never had any convulsions or any disease, except an attack of bronchitis.

Present Condition.—He is well nourished; height $46\frac{1}{2}$ inches. The skin is smooth and healthy. The head measures $20\frac{1}{8}$ inches in circumference and is suggestive of rickets; fontanelles closed. The father's head, however, is unusually large and of the same type. The paternal grandfather could not get a hat large enough to fit him in any of the stores. The bones are normal and there is no enlargement of the epiphyseal lines (see radiograms). The chest is 29 inches in circumference. There is a depression on both sides of the thorax along the seventh ribs. The costal arches are prominent and expanded. The abdomen is somewhat pro-

tuberant and measures 30 inches in circumference at the level of the umbilicus.

The face is uninvolved. He can close his eyes tightly. The muscles of the tongue, deglutition and mastication are normal. The ocular muscles are normal. There is a tendency for the mouth to be kept open, but its movements are well performed. Teeth are all present, upper incisors are decayed.

MEASUREMENTS

	R.	L.
Calf	5 $\frac{3}{4}$	5 $\frac{3}{4}$
Thigh	7 $\frac{1}{2}$	7 $\frac{3}{8}$
Ankle	4 $\frac{1}{2}$	4 $\frac{1}{2}$
Groin	9	9
Wrist	4 $\frac{1}{4}$	4 $\frac{1}{4}$
Forearm	5 $\frac{1}{4}$	5 $\frac{1}{8}$
Upper arm	4 $\frac{7}{8}$	4 $\frac{3}{4}$
Neck	8 $\frac{1}{2}$	

The measurements are the same on both sides, except that the right forearm, upper arm and thigh are each one eighth inch larger than the left.

When the patient sits up there is a kypho-skoliosis of the lumbar and lower dorsal vertebræ, which almost completely disappears when the patient is held up under the arms. This deformity also disappears to a very large extent when the patient lies down. In the ventral position a slight degree of skoliosis persists. (See Roenténogram.)

In the sitting posture the body becomes bunched up. It is interesting to note here that Collier and Wilson¹ state that "it is remarkable that no spinal deformity has occurred from this state of instability of the trunk."

There is considerable relaxation of the ligaments of the hip and ankle joints, so that the trunk and lower extremities may be placed in various fantastic positions. The ligaments of the joints of the upper extremities are also moderately relaxed. Extreme hyperextension of the ankle joint can be done so that the dorsum of the foot lies along the front of the tibia. There is a looseness of all the joints, except the knee joints, which are held in flexor contraction to a moderate degree. In the dorsal position the lower extremities are abducted and rotated outwards at the hip joints, flexed at the knees, and the soles of both feet are directed inwards and upwards. At times both legs are freely moved in a sort of wriggling fashion. When the abducted lower limbs, flexed at the knees, are brought into close adduction, the patient is then able to hold them in this position for a short while, after which they fall back into their former position (showing that there is some power in the adductors). He is able to move

¹ Brain, Vol. 31, 1908.

the extremities at all the joints. Locomotion is carried on by a process of rolling over from one side to another. By this means he goes from one room to another all over the house. He rolls equally well on either side. Recently he has been making attempts to get on his hands and knees.



FIG. 1. Roentgenogram Showing Scoliosis in Dorsal Position. (Dr. C. F. Baker.)

Muscular System.—There is a generalized loss of muscle tone of varying degrees. Voluntary power is preserved generally more or less. The muscles are small and weak. They have not the power they should have. They cannot be palpated distinctly, and it is difficult to differentiate them by touch from the superlying subcutaneous tissues.



FIG. 2. Roentgenogram. No Epiphyseal Enlargements. Bones Normal, but Undeveloped from Want of Use. (Dr. C. F. Baker.)

While the muscles are toneless there is a fair degree of voluntary power. In the dorsal position there is insufficient voluntary power in the muscles of the thigh to lift the legs against gravity.

The lower extremities are the most deeply involved. The major incidence of weakness is in the proximal portions of the extremities, especially the lower. The proximal muscles seem to be equally small and weak. Movements are greatest below the knees, and are of a peculiar squirming wriggling character.

The proximal muscles are proportionately smaller and show a greater degree of myatonia than the distal. Apart from this no single muscle or muscle group is affected. There is no fibrillation, no local atrophy of the pectoralis major, no winging of the scapulæ. A moderate degree of bilateral flexor contracture of the knee. There is a strictly symmetrical flaccidity, a weakness without paralysis.

Reflexes.—The superficial reflexes are present with the exception of the epigastric, abdominal and cremasteric. The plantar reflexes are flexor in type. No Gordon; no Oppenheim.

The knee jerk and ankle jerks are absent. The deep reflexes of the upper extremity are present. The right triceps jerk is weak. The organic reflexes are (normal) present.

Sensation to touch is normal. Patient is quite ticklish. There is always a marked reflex movement produced by pin prick in the distal parts of the lower extremities. This is less marked the more proximal the stimulus is applied. While there is an apparent defect of pain sensibility, no complete loss is demonstrable.

The patient shows no demonstrable evidence of involvement of the central nervous system. The characteristic feature is the loss of muscle tone and a diminution of voluntary power. The loss of muscle power is not limited to single muscles or muscle groups. The condition began congenitally. The question of rickets could be raised, but the early age of onset, the absence of all bony deformity seem to exclude it as a possible cause.

The inequality in the size of the limbs, the flexor contraction at the knees, the contrast between the movements of the arms and the weakness of the legs, the fact that the child could move its toes though the legs are weak and is now able to sit up and hold its head up are points which suggest the possibility of a poliomyelitis. But on the contrary the electrical reactions are not in keeping with those of the latter, but show a "myatonic" character; the myatonia is generally disturbed, there are no single muscle or muscle group atrophies. The main feature seems to

be a loss of muscular tone, which may be due possibly to a defect in the sensory mechanism in the muscles.

ABSTRACT FROM DR. STARR'S LETTER (FEBRUARY 9, 1912)

"I am not sure, however, that it may not be a case of anterior poliomyelitis occurring in infancy or possibly before birth. The contrast between the movements of the arms and paralysis of the legs, the fact that one leg is much worse than the other and that the muscles of the back on one side are much more affected than the other; the fact that the child can move its toes, though its legs are paralyzed and is now able to sit up and hold its head up showing that the muscles above the dorsal region are not affected, make it differ in a good many particulars from the ordinary cases of myatonia, where, as I understand it, the distribution of the muscular weakness is uniform throughout the body."

THE NATURE OF CUTANEOUS SENSATION, WITH AN INSTRUMENT FOR ITS MEASUREMENT¹

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Ramon y Cajal, in his "Histoire du Système Nerveuse," states that the nervous end-organs in the skin are so arranged that a nervous "discharge" is produced by excitation due to mechanical irritation. Further, that each terminal organ is constructed to receive a certain quantity of stimulation, after which ensues fatigue and cessation of reaction. In this view he is generally supported by histologists and physiologists. I believe that it can be shown that this view is incorrect in at least two particulars, namely, first, that a nervous "discharge" properly so called is not *produced*, and secondly, that the terminal organ does not become fatigued, with an ensuing cessation of reaction.

If we will note carefully the phenomena attendant upon a very simple experiment upon such nervous end-organs in the skin, and interpret them correctly, I think there will be no difficulty in proving these objections to be valid. The experiment is as follows: Press a sharp-pointed object—a pin—against the skin, and leave it in its position without increasing or decreasing the pressure for eight or ten seconds; then suddenly remove it. I think you will agree with me that the sequence of events is about as follows: first, the sensation of the original prick; next, a period during which this sensation gradually disappears; then, a stage at which the sensation *has* disappeared, and insensibility to the point of the pin supervenes, in spite of the fact that the pin is still in its position. Superficially regarded, this stage of quiescence might be taken as the point of fatigue, beyond which a greater irritation would be necessary to produce an effect; and this explanation has seemed to satisfy. But let us continue the experiment. If, after the period of insensibility has set in, we suddenly withdraw the pin, we are surprised to find a recurrence, very

¹ Presented before the New York Neurological Society, December 2, 1913.

slight it is true, but none the less a fact, a recurrence of the original sensation. That is, a cessation of the irritation reproduced the feeling. Evidently then, when a lessened stimulation restores the sensation, there can be no question of fatigue. Again, if in the experiment we press fairly heavily against the pin, the time elapsing before the sensation is lost can be measured in seconds, five or eight or ten indeed; whereas in pressing lightly the sensation vanishes in the fraction of a second. That is, fatigue comes on more slowly with a greater excitant than with a lesser—a manifest impossibility. I think therefore that it is not a question of fatigue at all which causes the insensibility to the irritant. So much for one objection.

The other objection to the explanation of Ramon y Cajal is to the production of a nervous "discharge" by the irritant. If it is not a discharge, what may it be? You have perhaps noticed a resemblance in the series of phenomena described, to another series produced when a constant current is directed into normal muscle. You may remember that at the closure of the circuit we see a contraction of the muscle, while during the continuance of the current the muscle remains absolutely quiescent. Then, after this latent period, if the current is broken, a second contraction takes place, weaker than before, but perceptible. Still another example may be cited. If a constant current is directed into the temporal region near the orbit, a flash of light is seen when the current is "made," no sensation during its flow, while at the "break" again is seen the flash. And these results are the same whether a current is made and broken, or whether a preëxisting current is suddenly increased or diminished.

In our experiment we have introduced no current, but our results are strikingly similar to these. Might it be possible that the constant current had already been introduced for us—that is, had already existed in the body? Have we an anatomical basis for such a possibility? Let us go rapidly over the anatomy of some of the various kinds of end-organ in the skin—the tactile corpuscles. Such a corpuscle is an ovoid-shaped body consisting of a capsule, membranous septa, and an intracapsular liquid or semi-solid granular substance, surrounding the free terminal filaments of an axis-cylinder which has penetrated to the interior of the corpuscle. The axis-cylinder has lost its myeline coat, and its sheath of Schwann before entering this structure, its sheath of

Henle being continuous with the lining membrane of the capsule, leaving the fibrillæ of the axis-cylinder free but for a minute covering of perifibrillar substance. The fibrils spirally advance through the corpuscle and terminate in free knob-like extremities near the limiting capsule, but never touching it or one another. Ramon y Cajal suggests that this structure is for the purpose of keeping up the living force of the impression in diffusing it rapidly to all possible impressionable surfaces. All the sensory nerve-ends in the skin are constructed in a similar manner—in some the capsular membranes are thick, with many layers and only one or two fibrils in the corpuscle—these are only slightly sensitive; while others have a veritable network of spirals of fibrillæ within their walls, and the walls are thin, consisting of but a single membrane: these are highly sensitive.

Now, what occurs when the pin is pressed over or near one of these end-organs? The semi-fluid intracapsular mass allows the end-knobs to be pressed closer to one another and to the limiting membrane of the corpuscle. This is synchronous with the first sensation of pricking that is felt. While the pressure of the pin continues, and these various parts continue to have the same relative position, our sensation is gradually dying out and finally disappears, the latent period of non-sensibility beginning. And the insensibility continues until the pin is removed and the parts reassume their original positions. Then again do we perceive the stimulus.

We can produce an analogous condition with a galvanometer connected to the two poles of a constant current whose terminals are separated by water contact. While the terminals are a fixed distance apart, the needle is quiet. A sudden approach of one terminal to the other causes an oscillation of the needle which gradually comes to a stop, albeit the current still passes. The needle will remain quiet until the terminals are again suddenly separated, when a second oscillation takes place. In this experiment, our terminals are the limiting membrane and the end-knobs of the tactile corpuscle respectively, the galvanometer a central cell, the one wire represents the afferent nerve fiber, while the other one is a grounded return represented in the body perhaps by the excellent conductor—the blood stream—connected with the capsule of the corpuscle. The efficient cause of the sensation, then, is the diminution of the resistance to the passage

of the current between the terminal knobs of the corpuscle on the one hand, and the capsule of the corpuscle on the other, due to their closer approach. No original discharge need therefore be *produced* as Cajal declares, but simply a change in the intensity of an already existing current is necessary—the strength of such current varying inversely as the resistance, and the resistance being diminished by the pressure on the end-organ. The idea therefore, of a nervous “discharge” as well as so-called fatigue in the end organ, is hardly tenable in the light of this theory and its supporting facts.

Evidently, if this theory is true, there must be throughout the body continuous streams of current flowing, and it is the diminution or heightening of their resistances that produces effects. Such a theory presupposes a comparatively great current-production in the body. Marinesco supposed that the chemical disintegration of the Nissl bodies in the cells of the cerebro-spinal system furnished the required kinetic energy, but Bielschowsky has shown that this cannot be true, for when ganglion cells are poisoned by selective drugs, though the muscles which they control become paralyzed, yet the muscle regains its function before the Nissl bodies in the central cell reorganize; and, in the evolution of the nervous system, the muscle acts before there is a nerve to innervate it. Therefore, the cells of the cerebro-spinal system cannot furnish the energy. It must be produced at some other point of the circuit. We do know that the various activities of the bodily organs do produce currents which have been measured. Thus, active muscle produces current, as was shown by Du Bois Reymond and Matteuci. Evaporation from the skin does the same. The oxidation of carbon, the chemical transformation in the viscera, the friction caused by the circulating blood in the blood vessels all give rise to electric currents. So that the assumption of the peripheral origin of the necessary kinetic energy is not far-fetched. One series of experiments which I performed on animals depended for its results upon this supposition.² Briefly sketched, the experiment was as follows: the stomach, which has duplicate innervation from the vagus and from the sympathetic through the semilunar ganglion, was experimented upon. As the fibers of this double supply are distinct

² Experiments on the Nervous Mechanism in the Production of Hyperplasia, JOURNAL NERVOUS AND MENTAL DISEASE, May, 1913.

and separate until they reach the stomach wall, where they unite in the plexuses of Meissner and Auerbach, it is fairly simple to interfere mechanically with one set without disturbing the other one. I did this by tying off the vagus above the diaphragm sufficiently firmly to cause a pressure neuritis without entirely cutting out its conductive power, increasing thereby the resistance to be overcome by the nerve current, in this circuit. If the source of the energy were developed in the stomach, then we would have as a result of this increased resistance via the vagus, a greater flow through the sympathetic; and by virtue of this greater flow, an increased activity in the sympathetic ganglion with the reciprocal increased activity in the vegetative functions of the stomach glands. In other words, we ought to find an excessive growth of cells in the stomach. As a matter of fact, the animals, which were allowed to live for three months after the operation, all showed a marked increase in the number of glands in the stomach. This increase amounted to three and even four million glands in some instances. I think that it is reasonable to suppose, therefore, that the stomach was the source of the energy which furnished the current. A corollary to this theorem would seem to be that as the source of the energy is the stomach, and as the two sets of nerve fibers unite in the plexuses of the stomach, the current would have a circuit without the necessity of traversing the higher ganglia, and could therefore dispense with the latter. And this is exactly the fact. Langley, Pawlow, and others have shown that if all the nerves connecting the stomach with its central ganglia are severed, the stomach will still continue to perform its work for an indefinite time albeit irregularly and wastefully.

We now have all the elements necessary for our preëxisting constant current, and this fact, coupled with the phenomena we have observed in cutaneous sensation, leads me to present this theory of the nature of cutaneous sensation, namely.

1. Cutaneous sensation depends for its production upon the changes produced in a constant current, preëxisting in the end-organ;
2. These changes are brought about by varying resistances to the passage of this current through the end-organ; and
3. The resistances may be made to vary by different means,

the chief among which may be said to be pressure and temperature.

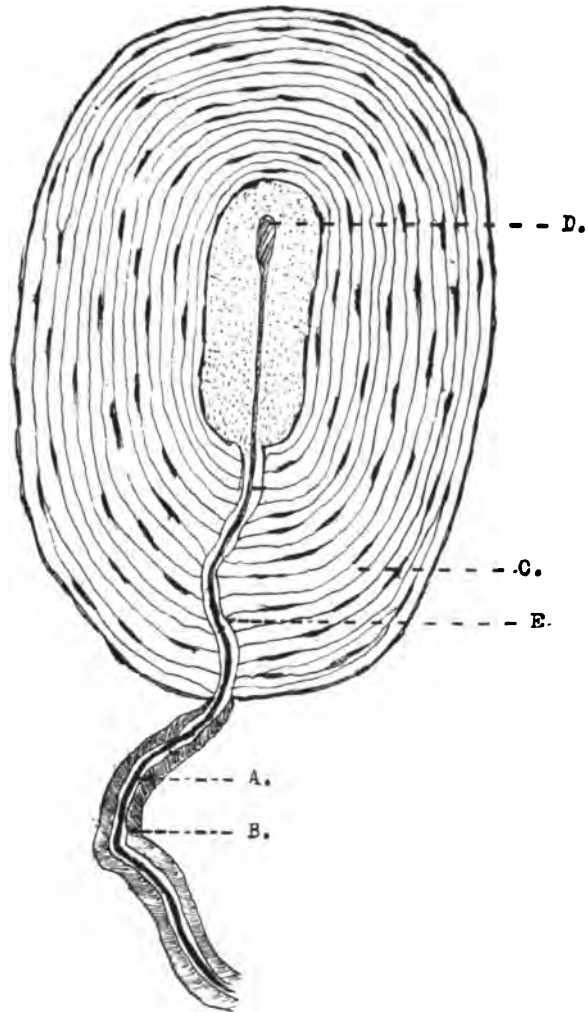


FIG. A. Pacinian Corpuscle. A. Axis Cylinder. B. Myelin Sheath. C. Capsular Layers. D. End Bulb. E. Sheath of Henle.

Let us now recur to our first experiment and amplify it somewhat. Actually, though not appreciably, the pin-point is felt as "touch" before it begins to be felt as pain. And after the pain has vanished, that is, sensibility to the point has ceased, we

still feel a pressure at the same place. But even this pressure is evanescent and also disappears in its turn, even though the pin continues to press on the skin. But its disappearance is much slower than that of the pain and its termination is more difficult of detection.

The time between the first sensation of "touch" and its transition to pain is almost instantaneous, and clinically defies measurement. The time between the disappearance of "pain" and that of "pressure" is much longer but very indefinite. But the time

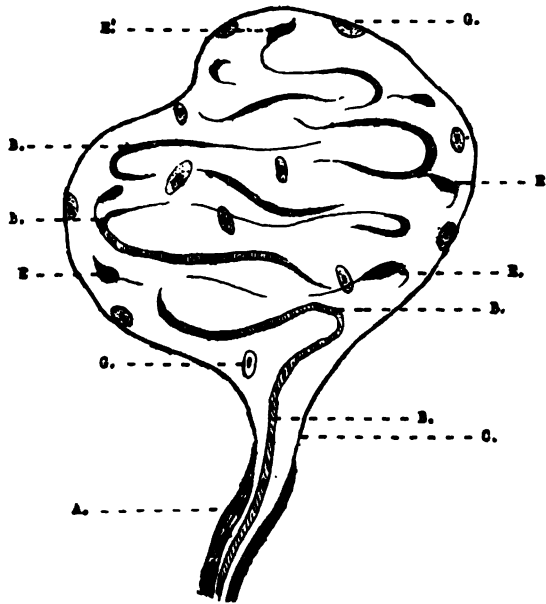


FIG. B. Tactile Corpuscle of Meissner. A. Myelin Sheath. B. Axis Cylinder. C. Sheath of Henle. E. End-Bulbs. G. Capsular Cells. E' Terminal Bulb.

from the beginning of the pin-prick as a painful sensation to its disappearance as such, is definite in its length, and can be measured, for its beginning and its end are well marked. This period is comparatively easy to estimate. It is for this reason that I have taken the so-called pain sense as the type of cutaneous sensibility and have attempted to measure its intensity.

Both the sense of touch and that of pressure are in their origin of a nature similar to pain, as we have seen in studying

the construction of the different end-organs,—there is even reason to suspect that the temperature sense is also closely allied—but their measurement introduces problems which vastly complicate matters.

Now, the different conditions in the evolution of the sensation of pain are variable. The original pin-prick may be superficial or deep. In the former case, the length of time taken for the sensation to disappear—which I call the pre-latent period, is short, a fraction of a second; while in the latter it may be many seconds in duration; but in my experience there is a certain direct ratio between the depth to which the pin presses and the pre-latent period, *i. e.*, the deeper the pressure, the longer the pre-latent period. In hypersensitive areas, the prelatent period is longer than in normal ones, and in hyposensitive areas, it is shorter. These facts give us a basis for the construction of a formula for sensitiveness. It is ($S=T/D$) in which T represents the time of the pre-latent period in units of time; while D represents the distance to which the pin descends in units of distance.⁸ An instrument based upon this formula was made for me by Dressler of New York City. It is constructed as follows:

A flat circular base is perforated for the egress of a pin which descends by turning a milled head micrometer screw. Each

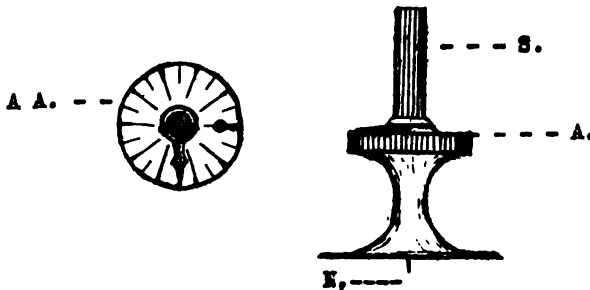


FIG. C. A. Position of Dial. A.A. Dial seen from above. S. Milled Head. B. Needle point emerging from base.

entire turn of this screw causes the pin to descend one millimeter below the base. A dial connected with the screw-head enables one to read easily the amount of descent in $1/20$ parts of a millimeter, while the unit of time was conveniently fixed at $1/5$

⁸ That is, we can express sensitiveness in terms reduced to time and distance—both of which are capable of measurement.

second. It is used in the following manner. The flat base is placed against the skin and held there without undue pressure, the dial at zero. Slowly the screw is turned until the patient states that he feels the point of the pin. From this moment the time in $1/5$ seconds is counted until he states that he no longer feels the pin. The depth of the descent is then read from the dial in $1/20$ millimeters. The ratio of time units to distance units is then a matter simple to calculate. In normal conditions this ratio will vary from $1/2$ to $1 1/2$ for different parts of the body. The scale which I have found convenient is a ratio of

0	anesthesia
0 to $1/10$	grade 1
$1/10$ to $1/2$	grade 2
$1/2$ to 1	grade 3
1 to 2	grade 4
2 to 3	grade 5

and so on, of which grades 1 and 2 denote hyposensitiveness, 4 and 5 hypersensitiveness. So that, for example, if the time for the pre-latent period is $1 3/5$ seconds and the pin has descended $14/20$ of a millimeter, we get the fraction $8 \div 14$ which is greater than $1/2$, *i. e.*, grade 3.

This little instrument, when used properly, is of some value, not only in diagnosis, but in setting a standard of sensation for each patient. So that instead of being reduced, as now, to the simple statement that there is hypersensitiveness or hyposensitiveness present, we are enabled to register the sensitiveness in degrees with fair accuracy. But, exceeding this in importance, is the power it gives us to determine slight differences of sensation, which until now has hardly been possible. I shall cite only one instance. We had at the Neurological Institute some weeks ago, a patient with brain tumor. His symptoms were apparently conflicting, so that the localization was variously given as cerebellar, cerebello-pontine angle, and thalamus. Upon examining the patient with this sensitometer, I found that the sensation of the entire right side of the body registered between grade 1 and grade 2. On the other side it was always grade 3 and occasionally grade 4. While he had been examined in the ordinary ways by many, no differences between the two sides could be made out. The tumor therefore had to be in a situation in which the sensory tracts were interfered with, on the contralateral side to the hyposensitiveness, *i. e.*, left side of the brain. This,

taken with the other signs, was sufficient to locate it positively in the pons: and there it was found on autopsy. We can therefore diagnose with a fair degree of accuracy, the fact of interference with the sensory tracts by means of this instrument, long before cruder methods can give us any information whatever.

In hysterical hypesthesias also, the instrument is of value. The patient will deny that he feels the pin-point until the point has descended quite deeply. But this excessive depth in a normal sensory system, organically sound, will be followed by a pre-latent period of proportionately greater length, and the resulting ratio of time and distance will therefore remain the same. In our experience, the hysteric has been differentiated from the organic hypesthesia very clearly a number of times. I cannot dwell upon the one important feature in the use of this sensitometer too long, namely, that it is never the question with the patient of the *intensity* of the pain he feels—about which there is always the great personal element, the personal equation, which enters, but of a certain definite *length of time* during which he feels the pain, and about which there is little or no uncertainty. In this regard it differs from all other instruments for testing sensation.

Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

DECEMBER 2, 1913

The President, DR. SMITH ELY JELLIFFE, in the Chair

A CASE OF SUBCORTICAL VISUAL APHASIA

By C. C. Beling, M.D., of Newark, N. J.

Dr. Beling presented a man, 62 years old, married, who was referred to him on February 28, 1913, by Dr. F. W. Webner. His family history was unimportant. The patient was a teacher, a highly educated man, whose habits had always been moderate. He had been engaged at his profession for over forty years, and at the present time was superintendent of the public schools in a large city. For eight years, between the ages of 42 and 50, he spent hours and days in the development of armor plating and the study of electricity as a recreation and diversion. He afterwards thought that these diversions were not of the right sort, as they were too brain racking. Excepting for an attack of inflammatory rheumatism twelve years ago, he had always enjoyed good health. There was no venereal history.

On February 23, 1913, the patient first noticed some difficulty in reading his morning paper, and on the following morning he could not read at all. On the same day he consulted Dr. Webner, an ophthalmologist, and in the afternoon he visited a neighboring city to attend an educational meeting for which he had prepared a paper. He found that he was unable to read his paper, and it had to be read for him.

When Dr. Beling first saw the patient, on February 28, 1913, he complained of a feeling of constriction in the left temporo-frontal region, together with a failure of vision and inability to read. The pupils were regular, of equal size and they reacted normally. The fundi only showed evidence of disease due to myopia. Color recognition was very much impaired, and it was almost impossible for him to distinguish one color from another. There was a right homonymous hemianopsia.

The patient's vocabulary was much more limited than normal, especially without distinct conscious effort. Pronunciation and speech were fluent; words or syllables were not displaced and the interpretation of nouns and verbs was accurate. He could write spontaneously, but writing meant nothing to him. He read many letters incorrectly. He did not understand written questions or commands that were shown to him, yet their letters and forms were distinct to him, but not their names and sounds. He could repeat the alphabet readily. He was unable to copy from printed to written letters, but he could copy from print to print and with difficulty from writing to writing. He could write from dictation words that he heard and could repeat them correctly. Objects seen he

could name only with the greatest difficulty, and by a process of round-about association. He was unable to estimate distances correctly. There were no visual hallucinations.

The patient had a systolic murmur at the apex, with marked accentuation of the second aortic sound. The blood pressure was 250 mm.; pulse, 60. The reflexes of the upper extremity were active. The patellar reflexes were exaggerated, especially that on the right side. There was no Babinski; no ankle clonus; no rectal nor vesical involvement. No sensory disturbances to touch, temperature or pain. The examination was otherwise negative. The patient stated that he had a subjective loss of equilibrium. There were no evidences of ataxia.

The diagnosis in this case, Dr. Beling said, was subcortical visual aphasia (pure word-blindness or alexia), associated with right homonymous hemianopsia and hemi-achromatopsia, indicating a subcortical lesion beneath the left angular gyrus, probably hemorrhagic in nature, cutting off the afferent visual impulses from both half vision centers to the visual word center, and to some extent implicating the optic radiation.

When Dr. Beling's patient was invited to give a description of his symptoms, he said it seemed queer to a man who had been engaged in school work all his life to find himself unable to read even the simplest words. He stated that his vocabulary had not been greatly impaired, but his chief difficulty was in recalling proper names, even the names of his relatives and intimate friends. General terms came to him quite easily, and he had less difficulty in recalling the first name of persons he knew intimately than the family name. He was now gradually trying to reeducate himself, and he had arrived at a stage where he could recognize two or three letters of a word at a time. At first he found it necessary to learn one letter at a time. It has been impossible to read words as "wholes" except words of one or two letters, and a few of the commonest words of three letters, as boy, dog, etc. In general, he had found it necessary in reading to name the letters of a word one by one until all had been named, or enough to infer the rest of the word. This act consisted in essentially converting visual percepts of letters into auditory percepts. He had found that some letters were recognized more readily than others. Thus, the capitals A, O, W, and X were among the most easily recognized. Certain letters became very easy to identify after their peculiar marks had been fixed in the memory. For example, G became easily recognizable by the thickened part at the lower extremity, g by its variation from the o. Among small letters, d and b had been difficult to discriminate. They were discriminated as visual percepts, but the difficulty was in *naming*. He had found helpful the device of describing letters sometimes employed in teaching children, as, for instance, "round o," "crooked s," "dotted i," "crossed t," etc.

In reply to a question as to whether throughout his life the visual or the auditory had predominated in his perception of language, the speaker said that as a small boy his memory for spoken words was very acute, and after listening to even long sentences, he could repeat them very accurately. In the course of years, however, he had come to rely more upon his visual perception than upon the auditory, and had even schooled himself to inhibit auditory impressions that did not particularly appeal to him. In short, he had increased the power of the eye at the expense of that of the ear.

Dr. L. Casamajor said that during the past two years he had seen

two cases of alexia, without agraphia. One case was that of a young woman, with absolute alexia and a clear-cut hemianopsia. The patient was lost sight of, and the next time he saw her, about a year later, she had been fairly successful in reëducating herself, which she simply did by reading until she could understand what she read. In the other case there was a tumor of the calcarine fissure and the patient did not recover his ability to read.

Dr. William B. Noyes said the remarks made by Dr. Beling's patient in connection with his attempts at reëducation recalled to his mind a statement he had repeatedly heard from teachers and from those who had observed school children in recent years, namely, that the number of cases of alexia or freak spellers was rapidly on the increase. There were a certain number of children, apparently bright and well up in their class in other studies, but hopelessly behind in spelling, and in their whole school life they were retarded because they could never learn to spell correctly. Such children were probably examples of developmental alexia, and were unable to distinguish between the finer points of certain letters. Memory and retention were good, but they often failed in spelling, including sometimes even the simplest words.

The President, Dr. Jelliffe, said that while he did not believe that we could ascribe the aphasia in a case of this kind to a purely psychogenic condition, there might be a relationship between the functional and the organic, in that the psychogenic element might be a determining factor in the forgetting of words, but it was not the only factor. For example, the patient would probably be more apt to forget the names of people that he disliked than of those he liked in the Freudian sense. A case of this kind might help us in the solution of a very complicated problem, namely, the relationship between acquiring language, as such, and acquiring certain general terms that had no inherent intimate association with the language of logical thought, but were acquired by the *en bloc* method, and had no intimate connection with our educational processes as such.

WILSON'S DISEASE, PARALYSIS AGITANS OR MULTIPLE SCLEROSIS: A CASE FOR DIAGNOSIS

By William C. Herring, M.D., and Smith Ely Jelliffe, M.D.

The patient was a man, 29 years old, a telegrapher by profession, who came to the clinic of Dr. Graeme M. Hammond at the Post Graduate Hospital about a month ago complaining of a tremor with which he was visibly affected. He stated that in 1910 he first noticed a tremor of his left hand; this gradually became worse, affecting the function of the hand and arm. Within six months there developed a marked stiffness and apparent weakness of the arm which had since persisted and grown worse. About this time the right hand and arm became similarly affected, so that in the latter part of 1911 he was unable to continue his work at the telegraph key. The tremor had become more and more violent, and the stiffness more marked and disabling, and ten days before coming to the clinic the company in whose employ he was had informed him that they no longer had any work which they thought he was capable of performing.

In addition to the tremor, the patient stated that for the past two years he had had difficulty in retaining his urine. About two years ago he

noticed that the left side of his face was "drawn," and he also thought that his voice had become affected and that he found it more difficult to talk than formerly. The tremor of which he complained now affected the entire body, including the head. He found it very difficult to do anything, for himself, such as dressing and undressing, although he was able to walk and get about. His family history threw no light on his present illness. The patient denied syphilis, but admitted four distinct attacks of gonorrhea. As a child he had measles and diphtheria.

On examination, the patient, who was well nourished, presented a characteristic, persistent tremor, coarse and of considerable amplitude, and more or less rhythmic. It was not aggravated by the performance of a single act, such as touching the nose with the finger or bringing the ends of two fingers together, nor had it the character of the so-called "intention tremor." On the other hand, the performance of any more complicated maneuvers, such as unlacing his shoes or buttoning his clothes, seemed to make it worse.

There was no nystagmus, the eye movements were unaffected and normal, as were the pupillary reflexes. There was a spasticity or hyper-tonicity of both the upper and lower extremities; the deep reflexes were sluggish and difficult to obtain, but all seemed to be present. The reflexes of the right side seemed to be slightly more active than those of the left, and this was particularly true of the patellar reflexes. No clonus was obtained. In the superficial reflexes there was a considerable difference between the two sides in the abdominal and cremasteric reflexes, that on the left side in both cases being feebler and more sluggish. The plantar reflexes were markedly different from one another, the right one being distinctly flexor and the left as distinctly extensor; both, however, were feeble and of small extent. There did not seem to be any impairment of the gait. There was no ataxia nor incoördination of slowly executed movements. There was, however, a marked adiachokinesis shown when the patient attempted rapid symmetrical movements with both hands. The eye grounds were reported as normal and there were no signs of choked disc or optic atrophy. Vision was reported 20/20, and there were no scotomata nor interlacings of the color fields.

The serological examinations of the blood and spinal fluid were negative. Tests were made for complement-fixation both for syphilis and gonorrhea. The globulin test and leucocyte count were reported normal. The pressure of the spinal fluid, however, was very low, namely, 20 mm. of mercury. The spinal fluid showed the presence of a sugar-like substance with Fehling's test. The urine showed the presence of considerable indican but was otherwise negative. There was a marked dermatographia rubra, especially marked on the back. There were no gross sensory changes, and stereognosis was intact. The patient complained of occasional paresthesia and numbness of the hands.

Dr. B. Sachs said he could recall a number of cases of paralysis agitans in youthful individuals, one of them reported by himself some years ago, which presented certain peculiarities. He had seen several such cases in which there was a curious admixture of symptoms, which were partly those of disseminated sclerosis, while others were typical of paralysis agitans. The tremor in the case shown by Dr. Herring and Dr. Jelliffe was entirely in line with that seen in paralysis agitans, as were his attitude and the stolid facial expression. All these reminded him of the youthful form of paralysis agitans, but on the other hand he pre-

sented a number of features which were not in keeping with that diagnosis, particularly the mimic contracture of the muscles of the face, especially the lower muscles, such as we saw in lenticular degenerative conditions. In a borderline case of this character, therefore, it was safest to rely upon the chief symptoms, which were more nearly in keeping with paralysis agitans than with anything else. Dr. Sachs said that to him, disseminated sclerosis appeared to be the least plausible diagnosis. It was certainly a rare case. Whether it was one of Wilson's disease he was not prepared to say, because he had not formed any definite opinion of that condition.

Dr. M. Neustaedter suggested the use of the tremogram to determine the character of the tremor. He said it was apparently not an intentional tremor, as the patient was able to steady himself by leaning on a chair.

Dr. Foster Kennedy said the tremor in this case did not impress him as being similar to that of Wilson's disease. In the facial expression, however, he thought there was a close similarity, but in this case there was apparently lacking the instability in the patient's emotional sphere which was quite characteristic of Wilson's disease. The speaker said he was rather inclined to agree with Dr. Sachs that the case represented an abnormal type of paralysis agitans, although so calling it would not advance us one iota in the diagnosis.

Dr. I. Abrahamson said this patient had no indications of a multiple sclerosis excepting a diminished abdominal reflex on one side and a very doubtful Babinski. There was no nystagmus nor changes in the eye grounds. The speaker said that pathologically the lesion could best be placed in the mid-brain, and that the diagnosis should be somatic, without attempting to give the disease a name. He did not think the picture corresponded entirely with Wilson's disease, from the descriptions he had read of that disorder. Rather, he would class this as a degenerative disease of the mid-brain.

Dr. William M. Leszynsky said that about a year ago, two similar cases were shown at a meeting of this Society. One was that of a girl of 22 with many symptoms closely similar to those shown by this patient, and in the discussion that it evoked there was much difference of opinion, although the majority of those who spoke regarded it as a case of paralysis agitans.

In regard to the case shown to-night, Dr. Leszynsky said, the symptoms seemed to correspond more with paralysis agitans than anything else. He had seen several cases of this disease in youthful patients and recalled one in particular, in which, as the man grew older, a typical paralysis agitans was developed.

Dr. Jelliffe said that in one of the cases he presented last winter, the young woman to whom Dr. Leszynsky had already referred, the possibility of its being an example of Wilson's disease was brought out in the course of the discussion.

In the case shown to-night, Dr. Jelliffe said, tests were now being made to determine more of the functional capacity of the liver. Personally, his observation in this case was that the liver was distinctly diminished in size. Dr. Wilson himself had emphasized the fact that his disease bore a closer resemblance to paralysis agitans than to anything else, so far as the motor signs were concerned, and the consensus of opinion to-night was that this patient had a paralysis agitans-like tremor. Of course, the main question was one of anatomical localization of the disease

process, and the whole problem revolved about that. The question of a lenticular degeneration was also a localization problem. The speaker thought an ordinary multiple sclerosis could be ruled out, but a multiple sclerosis did not necessarily involve the pyramidal region. The marked dermatographia rubra which this patient showed indicated possible anatomical points of localization that were also suggestive of Wilson's disease. Again, there had been more or less distinct progress in this patient's symptoms. He was certainly much weaker than formerly, there was an increase in his emotional instability, as indicated in the risus, which at times almost culminated in spasmodic laughter, and the dysphagia was increasing.

In the further tests which they expected to make in connection with this case, the speaker said, some suggestive points might be discovered which would be helpful in the diagnosis. Wilson, in his description, laid considerable stress upon a toxic factor as giving rise to the degenerative process. Possibly, Dr. Jelliffe said, we may have in these cases not so much a toxic factor as a defect in certain pathways over which sympathetic impulses were carried. In other words, was the lenticular degeneration disease area a result of a peculiar specific toxin, analogous in a general sense, let us say, to that seen in coal gas poisoning, or did the diseased liver process involve sympathetic receptors, with later secondary degenerations in the sympathetic pathways—laying aside Waldeyer's laws for the time being—which produced in their hypothetically localized areas in the lenticular region a definite defect area? This defect area constituted a *locus minoris* for other toxic possibilities.

A CASE OF BRAIN NEOPLASM WITH UNUSUAL FEATURES

By Louis Casamajor, M.D.

Dr. Casamajor presented a negress, fourteen years old, who was admitted to the Neurological Institute, Third Division, on March 7, 1911, with the history of failing sight and hearing, and partial inability to use the right arm and leg. Her symptoms dated back several months and were growing progressively worse.

The patient's family history was negative. The mother had had no miscarriages, and both parents were in good health. Two children had died in infancy and there were two other children, alive and well. There was no history of epilepsy, insanity or other nervous disease, and with the exception of measles in infancy, the child had always been in good health until August, 1910, when she began to complain of headaches, and became cross-eyed. She was taken to the Vanderbilt Clinic, where glasses were ordered, and her symptoms disappeared within six weeks.

In November, 1910, it was noticed that the child slept more than usual and complained of occasional headaches. A month later there was some loss of function in the right arm; the fingers were stiff and numb, and within a fortnight she began to complain of weakness of the right knee and stiffness of the leg. Subsequently, her sight and hearing became impaired and grew progressively worse.

Physical examination showed a dull, undersized negress, with a well-marked right hemiplegia, with increased reflexes on this side but no Babinski. An examination of the eyes made by Dr. Ward A. Holden

showed papilledema of about 3-4 diopters on each side, with beginning atrophy. Vision was 20/70, R. and L. The visual fields were normal; the Wassermann test was negative as was also the urine.

Operation, March 11, 1911, by Dr. Charles A. Elsberg: A right subtemporal decompression showed that the intracranial pressure was markedly increased. The operation was followed by a hernia cerebri, which grew to the size of a croquet ball, and the patient's condition became progressively worse. She gradually became totally blind, so that she would ask whether the sun was shining or not, and could hear only very loud sounds. Her right hemiplegia progressed, and by June, 1911, she was practically bed-ridden, blind and deaf. In September, the mother, who objected to the large hernia cerebri chiefly on cosmetic grounds, began bandaging the head tightly. With this, the patient immediately began to improve. The hernia became smaller and the child much brighter. The sight and hearing gradually returned, but the hemiplegia remained about the same, and at the present time the girl is able to see as well as before the operation, although the optic discs look very much atrophied. There is no deafness of any account at present. The hemiplegia was evident, the right arm being more affected than the leg. She walked with a slight right limp, while the right hand was contracted and useless. The decompression opening was soft, and there was no evidence of any increased intracranial pressure.

Dr. Casamajor said this patient was presented in the hope that some of the members would be able to tell him what happened in this case.

Dr. Sachs said that more than ten years ago he saw a case where Dr. Arpad G. Gerster operated for him to relieve symptoms of intracranial pressure similar to those in the case shown by Dr. Casamajor, and which were attributed to the presence of a neoplasm. Upon trephining the skull and incising the dura, a vascular tumor of enormous size presented itself. On account of the patient's condition, no attempt was made to remove the growth, and after this simple decompression the patient recovered from all her symptoms excepting that there was no improvement in the double optic atrophy which had existed prior to the operation. In the case shown to-night, as in his own case, there may have been a vascular neoplasm which underwent a process of retrogression which may have been hastened by the constant pressure applied by the child's mother.

Dr. Abrahamson said that in the case shown by Dr. Casamajor there was possibly a cyst near the ventricle, which, aided by the pressure applied, may have emptied into the ventricle, or else a localized posterior basic serous meningitis retention of fluid in the larger cisterns; here the increased pressure from without was the means of reestablishment of the circulation of the cerebrospinal fluid.

Dr. Kennedy said that in spite of the good results in this case, he did not think that pressure upon these hernial protrusions could be regarded as a safe therapeutic measure. He recalled the case of a boy where a decompression operation in the occipital region was followed by a large hernia, and in that case even slight pressure on the hernia rapidly induced unconsciousness.

A CASE OF MUSCULAR ATROPHY ON A SYPHILITIC BASIS

By Louis Casamajor, M.D.

A man, 28 years old, a German soda water clerk, had paralysis and marked atrophy of the muscles of the right shoulder girdle and arm. The patient's previous history was negative, excepting for a syphilitic infection six years ago, which was insufficiently treated.

Present illness: About the end of September, 1913, the patient noticed that his right arm and shoulder were getting weak. He first had difficulty in reaching objects over his head. This weakness gradually increased, and in the middle of November he was compelled to give up his work, as he could no longer raise the arm. On November 24 he was admitted to the Neurological Institute. He had never had any pain in the arm or elsewhere.

Physical examination showed a well built and nourished young man with marked atrophy of the right arm and shoulder girdle muscles. There was total flaccid paralysis of the deltoid and other shoulder girdle muscles. Extension of the elbow was fairly strong, but flexion was practically lost. The forearm and hand muscles were much weaker on the right than on the left side. Measurements showed that the right arm was one inch smaller in circumference than the left. The reflexes were much diminished in the right arm. There was no sensory loss. The electrical reactions showed a partial R. D. in the right shoulder girdle muscles, and the other muscles of the right arm were electrically hypoexcitable. There were no abnormal signs in the rest of the body.

Serological examinations gave the following results: Blood serum, Wassermann positive. Cerebrospinal fluid, Wassermann positive; globulin normal; cells, 149 lymphocytes per c.mm.

The patient had made slight improvement under active antisyphilitic treatment.

Dr. I. Strauss said the case shown by Dr. Casamajor was in line with the investigations made by Spiller in connection with progressive muscular atrophy, who found syphilitic changes in the cord in many of those cases. This case was in some respects even more important, because Spiller's findings were based on post-mortem material, while here the Wassermann and other tests left little doubt as to the nature of the lesion.

Dr. Frederick Tilney, of Brooklyn, said he had seen two cases of muscular atrophy with positive Wassermann reactions in the blood and spinal fluid. In both instances the atrophy was progressive. The trouble started in the shoulder girdle, and then extended to the biceps and triceps and to the muscles of the forearm and hand. One of the cases, after eight years, showed distinct involvement of the sternocleidomastoid and trapezius, and the man now had the characteristic deformity resulting from the involvement of those muscles. In one of the cases, that of the longest duration, the muscles showed complete reaction of degeneration, while in the others there were some indications of degenerative changes in the muscles.

THE NATURE OF SOME FORMS OF CUTANEOUS SENSATION,
WITH AN INSTRUMENT FOR THEIR MEASUREMENT

By Walter Timme, M.D.

Dr. Timme reviewed at length the statement of Ramon y Cajal, in his "Histoire du Système Nerveuse," that the nervous end-organs in the skin were so arranged that a nervous "discharge" was produced by excitation due to mechanical irritation, and, further, that each terminal organ was constructed to receive a certain quantity of stimulation, after which ensued fatigue and cessation of reaction. In this view Cajal was generally supported by histologists and physiologists, but Dr. Timme believed it could be shown that this view was incorrect in at least two particulars, namely, first, that a nervous "discharge," properly so called, was not produced; and, secondly, that the terminal organ did not become fatigued, with an ensuing cessation of reaction. These conclusions, the speaker said, were based upon experimental work, and led him to present the following theory of the nature of cutaneous sensation:

1. Cutaneous sensation depended for its production upon the changes produced in a constant current, preëxisting in the end organ.

2. These changes were brought about by varying resistances to the passage of this current through the end organ.

3. The resistance may be made to vary by different means, the chief among which might be said to be pressure and temperature.

Dr. Timme then presented and described an instrument which he devised for the measurement of cutaneous sensation. This instrument, he said, when properly used, was of some value, not only in diagnosis, but in setting a standard of sensation for each patient, so that instead of being reduced, as now, to the simple statement that there was hypersensitiveness or hyposensitiveness present, we were enabled to register the sensitiveness in degrees with fair accuracy. But, exceeding this in importance, was the power it gave us to determine slight differences in sensation, which until now had hardly been possible.

Dr. Casamajor said that when he first saw Dr. Timme's instrument, he felt rather skeptical as to its value, but since he had seen it used in a number of cases, he had come to regard it as distinctly valuable. In spinal cord tumors, particularly, it indicated the return of sensibility below the upper level of anesthesia much earlier than its presence could be demonstrated by other methods. These examinations, as we knew, while tedious, were very important, and the speaker said he considered this instrument of precision a very valuable addition to our armamentarium.

Dr. Kennedy asked if by this instrument we could detect delicate changes in sensation that would not be indicated by other instruments of precision, such as von Frey's hairs? In this connection, the speaker called attention to the fact that some parts of the body were almost devoid of pain sensations.

Dr. Timme, in closing, said that with this instrument, which he thought was more sensitive than any other that had hitherto been used for this purpose, he had been able to detect differences in the degrees of anesthesia in the same individual not only over different portions of the body, but over corresponding areas, symmetrically situated, which had not been discovered by any other method. He wished to emphasize, in closing, the fact that the delicacy of the instrument did not depend upon the subjective

determination of the degree of anesthesia by the patient himself, but that the patient simply stated the observations; namely, the beginning of a sensation and its termination,—the calculation being made upon space and time relations, while the judgment of the patient did not enter. The instrument is unique in this regard.

SOME OBSERVATIONS UPON THE ETIOLOGY OF MENTAL TORTICOLLIS

By L. Pierce Clark, M.D.

Dr. Clark said that not the least important fact brought out by the modern analysis of mental disorders was the enormous significance of a closer study of infantile life. A few years ago it was thought that little or no mental data bearing on the after-life was taken up by the child before five or six years of age. It had been conclusively proven to most of us, however, that it was precisely the early childhood that was most important in the formation of physical and mental habits. From a neurologic and psychiatric standpoint the nursery life of the child was of the greatest importance in determining the trends that in later life made for safe voyaging or mental shipwreck. To many, the above statements might appear more or less trite and commonplace, but at the risk of re-stating the obvious, the speaker said he wished to call attention to these views with the hope that studies of the infantile mental life might be a matter of more frequent report in our study of the neuroses and psychoneuroses. As the latter class of nervous disorders made up the major portion of neurologic practice, the practical value of these remarks was evident.

Dr. Clark said it mattered little for the purpose of this discussion whether all types of torticollis were classed with pure spasm, or whether some of them were tics in their real nature, as he would confine himself to that sort of muscular spasm of the spinal accessory distribution which behaved like a tic in that it was a reflex, defensive or voluntary movement which had assumed an imperative character, had been long enduring and was not of a simple reflex origin nor of the rheumatic type. He then reported in detail the case of an unmarried man, 34 years old, a book-keeper, who was referred to him two years ago for study and treatment by Dr. Reginald H. Sayre, with the history that for the preceding three years the patient had suffered from a severe degree of spasmodic torticollis of the tic type which had defied all lines of treatment, even to that of full nerve resection of the spinal accessory. Aside from some degree of neurotic instability in the patient's immediate family, and a moderate degree of alcoholism in the father, who died of Bright's disease, the family history was negative. The patient suffered from no physical defect aside from a gradually increasing and severe left-sided spasmodic torticollis. For a year he had received inhibitional and medico-pedagogical training, which only ameliorated the torticollis.

In reporting this case, Dr. Clark laid special stress upon the psychic history of the patient, the personality study and habit formation. Briefly, he was always of a nervous temperament and especially lacked self-confidence. He was given to rigid self-examination and worry before each new task, even while at school, and this same feeling of inadequacy

followed him in business life later. An analysis of the sexual life showed that he had little sexual curiosity until about thirteen years of age. The embryo formation of sex-hunger, however, showed itself at a very early age in his firm attachment to his mother, who died when the patient was but a child. When he was five and a half years old, while at school, he began the habit of stroking the left side of the occiput with the left hand. This rather common habit persisted throughout the whole of the patient's adolescent and adult life until about one year before the torticollis appeared. At this latter time the whole habit-forming movement became for the first time a fully conscious one, and the patient made up his mind that the habit was purely mental. After considerable trials and self-conscious effort, he succeeded in breaking himself of raising his left hand to his head, but each time he checked the hand he noticed a slight instability, a sort of shaking tremor in the head, the maximum excursive movement of which was to the left. In the patient's words, "it seemed to be teasing for the petting movement of the left hand, as of old." Upon more definite analysis it was learned that in his home instruction by an elder sister, the patient used to recite to her, and during such recitations her right hand kept up a caressing movement of the head which was afterwards maintained by the patient himself, as he imagined this head stroking enabled him to gain confidence and learn easily.

Briefly, then, we had to deal with a neuropathic individual in which this torticollis of the tic type seemed to have been precipitated by the character of his work, but which had its essential origin in the order of its development from an infantile, pleasurable stroking movement started by his mother and continued after her death by his sister and himself through school, adolescent and adult life until brought into the conscious life, when the patient strove to break himself of the habit. Then the head developed a symbol or fragment-mechanism, and continued to perform its part of the act after the hand had ceased to coöperate in its part of the habit.

Dr. Clark said that even a short summary of the genesis of this single case of torticollis showed the enormous pains one must take in unraveling the complicated mechanisms concerned in this form of psychoneurosis. Nor was the end yet. When the patient was given the full benefit of this analysis several months ago, there was an astonishing and immediate improvement. The old feeling of tension to hold the head steady largely disappeared, but still the patient had not fully recovered. He still showed feelings of inadequacy, and under difficult situations the torticollis returned, less completely and intensely, it was true, but at times the tic was still present. Analysis was now in progress to root out the central core of inadequacy of feeling and will, etc., as far as possible. The speaker thought he was justified in saying that the central core of the habit movements in this case was an autopleasurable act or acts based upon an inherent defect, and that the modern analysis of the tics and habit movements proved that the two were at bottom essentially alike in genesis, and that they were but a part of a large class of obsessive neuroses, and should be handled and treated as such.

Dr. Reginald H. Sayre (by invitation) said that his experience with these cases of convulsive tic had convinced him that comparatively little could be done for them by surgical intervention. He recalled one aggravated case, a man who made horrible salaam movements and yet could ride the bicycle remarkably well, who improved for a few days after his

posterior nerve roots were cut; then his head again began to wobble and subsequently the abdominal muscles became involved, so that he was worse off than before. The patient described by Dr. Clark was put through a course of gymnastics, with only temporary benefit. He was then referred to an ophthalmologist, and glasses were ordered, but with no result. Dr. Sayre then divided the right spinal accessory and the posterior roots of the upper three cervical nerves. For a time the patient seemed better, but soon relapsed and was practically in the same state as before the operation. It was not until Dr. Clark took him under his care that he was able to hold his head at all quietly for any length of time. Dr. Sayre said that when he last saw that patient he could go for several days without a convulsive tic, whereas before Dr. Clark treated him the tic occurred about every twenty seconds. It seemed to him that these cases should be treated by the neurologist rather than from a surgical standpoint.

Dr. Kennedy said that Dr. Clark's paper was a step in the direction of bringing psychoanalysis out of the vague, nebulous region from which we usually heard it discussed. The paper recalled to his mind several cases of this type, one that of a ship's carpenter in the English navy, whose work compelled him to watch a lathe for many hours each day. When he passed the age of 50 he retired from the navy, and one day his boy was accidentally drowned. The father was greatly shocked when he heard the news, and that night he became subject to a peculiar head movement, apparently watching an imaginary lathe, as he had done for so many years. Various methods of treatment were unsuccessfully tried, and finally, an extensive nerve section was done with disastrous results. In that case psychoanalysis would probably have shown that these head movements were of subconscious origin, and took the man back to a time of life when his boy was still with him.

A second case was that of a woman of 50 who for upwards of twenty years had suffered from a serious form of torticollis. She had consulted numerous physicians, had taken large quantities of drugs and had submitted to posterior nerve cutting. Upon investigation it was learned that as a girl she was very fond of the violin, and had determined to make that her life profession, but she was the daughter of a straight-laced New England teacher who objected so strenuously to her proposed profession that she gave up playing the violin entirely and soon afterwards developed this inclination of the head toward the side on which she formerly held the instrument.

Dr. H. W. Frink said we must not forget that psychoanalysis really consists in two processes, a process of investigation and a process of interpretation. As a searching and exhaustive method of investigation it had not yet been equalled. In one of his cases, for instance, he had seen the patient for at least an hour every day for a year. No other situation in either professional or private life gives the patient such an opportunity to extensively disclose what he really thinks about, or so encourages and favors this disclosure, as does treatment by psychoanalysis. The analyst had, therefore, an opportunity to collect facts which is not offered by any other means of study yet devised. On this account the report of information brought out by a psychoanalysis should be regarded with no small respect, and if it contained observations that did not accord with certain notions popularly entertained, one should be slow to deny the correctness or significance of these observations until he had employed a method of study that was equally careful and equally favorable for the disclosure of intimate facts.

Dr. Sachs said that if any sense of self-superiority had been shown in connection with this general subject, it had been entirely on the part of the psychoanalysts, who seemed to have lost their common sense altogether. If any of the members present had, perchance, smiled in listening to a paper of this character, the speaker thought they were perfectly justified. He was entirely willing to include himself among that number, and he did not hesitate to say that he would continue to smile at any attempt to ascribe the symptoms of spasmodic torticollis, coming on in adult life, to sex hunger or head stroking in childhood. Such a course of reasoning seemed to him little less than an absurdity; it was revolting to the mind of any man trained in ordinary logic, and if this indicated the future trend of our present-day neurology, then the less we heard of it, the better.

Dr. I. Abrahamson said he found it hard to conceive any connection between a torticollis and head stroking in childhood, and if we accepted such an etiology, surely this condition would be almost universal. One might as well go back to intra-uterine life and make the assertion that the torticollis was the result of a breech presentation in which the child's arms were clasped about the neck.

Dr. Kennedy said the etiology of torticollis was so obscure that we should be rather cautious in rejecting or beating down any hypothesis that had been carefully thought out and presented for our consideration. The mere assertion that a hypothesis was untrue did not prove it so. While Dr. Clark had not proven the truth of his hypothesis, it was presented in good faith and might help us in solving the problem of the etiology of torticollis. Perhaps we might never find it, but this at least gave us a basis on which to work.

Dr. Sayre said that while this discussion between the psychoanalysts and anti-psychoanalysts was very interesting, the fact still remained that Dr. Clark, in gaining control over this patient's mind, had also gained control over the movements of the head. Previous to that, there had been some improvement after a course of gymnastic exercises taken by the patient before a mirror, but the treatment had been less effective.

Dr. Leszynsky said that some years ago he took a great deal of interest in the treatment of torticollis, and he had an impression that the condition was not as frequent now as formerly. The important point in the treatment of these cases was to gain control of the patient, and teach the latter how to control himself. This, apparently, Dr. Clark had done with the expenditure of a great deal of time and work, and the result, seemingly, had justified his efforts. Dr. Leszynsky recalled a very severe case of torticollis in a girl, a bookfolder, with a clonic movement of the head occurring with great frequency. In that case he gave intramuscular atropine injections, increasing the dose up to one-sixth of a grain, when she made a complete recovery. The case was reported in the *Medical Record* over twenty years ago. Subsequently, he found atropine effective in other cases, but not invariably. In two other cases the patients were referred to Dr. Krupa and were given psychomotor reëducation treatment with very good results. There was no excuse, the speaker said, for surgical intervention in these cases, and he was surprised that the method was still practiced.

Dr. Clark, in closing, said he had presented this paper with considerable hesitation, but as it showed the gradual transition of his own mind from the older view of holding the tics as defenses against unpleasant

situations of life to that of being really pleasurable gratifications to the psyche, it was worth while as an exposition of the manner by which his own conversion had been brought about. It showed the successive stages or orders of treatment for the tics from nerve cutting to psychoanalysis. When the reporter allowed himself to assume more of a passive rôle and really permitted the patient to evolve something of his own difficulties and the manner of development of the disease tic, he had gotten on the right road to cure the patient, who was now practically well of the tic but still had much readjustment of his whole life, its mental infantilism, to set right. A future report as to end results in this regard and the permanency of results was promised.

THE PHILADELPHIA NEUROLOGICAL SOCIETY

NOVEMBER 28, 1913

The President, DR. GEORGE E. PRICE, in the Chair

TUMOR OF THE RIGHT TEMPORO-SPHENOIDAL LOBE IN WHICH THE SYMPTOMS WERE PRINCIPALLY MENTAL ASSOCIATED WITH INCOORDINATION OF CEREBELLAR TYPE AND INTENSE PAPILLEDEMA

By Charles S. Potts, M.D.

H. B. White, 32 years of age and by occupation a blacksmith, was admitted to the Medico-Chirurgical Hospital on September 15, 1913. The principal complaint was headache and mental derangement. His previous history as given by his physician was that he had been an excessive user of alcohol, otherwise it was negative until about one year ago. At that time his family noticed that his disposition changed, he becoming irritable, morose and lost interest in his business. He continued at work, however, and about six months ago, while shoeing a horse, had what he called the "blind staggers," and pitched forward, striking the side of his head. Three months before admission he developed an urethral discharge, which was called gonorrhea by another physician, but which disappeared in a few days. Shortly after this he began to have pain in his shoulders, which was supposed to be due to gonorrheal arthritis. This soon got well and he then complained of severe pain over the right eye, which was much worse at night. This lasted until three weeks before admission, when he began to have spells of vomiting. Two weeks after this, or one week before admission, his gait became staggering. About the time that the headache began it was noticed that his memory was failing. It is stated that he would leave his home and go to some other place where he would want to remain, thinking it was his own home; that he would go to bed without removing his clothing, and frequently after the clothes were removed he would be unable to find them again.

When admitted he did not complain of headache, except when asked if his head ached he usually answered that it did, but if asked how he felt his usual answer was "first rate." Examination showed his pupils to be unequal, the right one being larger than the left and reacting very

poorly to light. The left one reacted normally. The response to convergence could not be determined as the patient's attention could not be held long enough. Examination of the eyegrounds by Dr. Fox showed papilledema in each eye between 7 and 8 diopters. His station was poor and the gait was of the cerebellar type, with a distinct tendency to go to the right. Otherwise examination was negative.

The mental condition was very bad and became progressively worse. He was restless, being with difficulty kept in bed, and when out of bed wandered about in an aimless way. He was almost completely disoriented for both time and place, and he would talk to imaginary objects. For short periods of time (several hours) he would be stuporous.

The Wassermann reaction with his blood serum was negative. On September 20, 1913, a right-sided temporal decompression was done by Dr. Stewart Rodman, the patient's physical condition at the time being apparently very good. An opening of good size was made, and the dura was found very tense, but was not opened. Immediately after operation the temperature began to increase and in ten hours reached 105.1° F., at which time he died. Consciousness did not return.

At the autopsy the wound was found in perfect condition, the brain showed the following condition:

The tumor was on the right side of the brain and could be easily seen. It was entirely confined, so far as the outside surface was concerned, to the temporal lobe, and occupied chiefly the first and second temporal convolutions and bulged outwards, its apex being in the middle portion of the first temporal fissure. Anteriorly it was about one inch from the fissure of Sylvius. It bordered on the fissure of Sylvius and on its lower surface on the second temporal fissure.

Horizontal section showed that the tumor extended inward about two inches and took in only the temporal convolution, it displaced and pushed anteriorly the corpus callosum, the whole hemisphere bulging into that of the other side. The lenticular nucleus, internal capsule and caudate nucleus were displaced. Especially was this true of the internal capsule. The posterior horn on the same side seemed to be enlarged. The tumor had a distinct border and was fleshy in appearance, but hemorrhagic in spots, especially in the cortical area. The tumor was entirely confined to the temporal convolution.

On macroscopic examination it appeared as a glioma.

Dr. Theodore H. Weisenburg said that Dr. Rodman did not cut into the dura, deciding to do a decompression in this way. If he had followed his original plan and cut the dura he would have found the tumor.

Dr. F. X. Dercum presented a case of aphasia motrice pure (Dejerine) or "anarthrie" (Marie).

Dr. Mills regarded the case as one of anarthria, changing to dysarthria, and spoke of the difficulty in swallowing which had been present.

Dr. Dercum stated that if Dr. Mills had seen the patient when he first came to the hospital, Dr. Mills would have pronounced the case as one of motor aphasia. The man was absolutely mute as regards articulate sounds and it was only after treatment had been established for some time that the man was able to break through the barrier and the anarthria gradually gave way to a dysarthria which he presents now. Dejerine's description of pure motor or subcortical aphasia applies absolutely to this man as he was when first admitted to the hospital. He could not utter a single articulate sound and yet he could read and could comprehend everything that

was said to him. The fact that he could read was sufficient to distinguish him absolutely from a Broca's aphasia. The lesion in this man's case was probably subcortical and was in the knee of the capsule and the adjacent portions of the basal ganglia, more particularly the lenticular. It is not surprising that such a case should present a difficulty in swallowing, for we have a similar difficulty frequently in pseudo-bulbar palsy. The speech phenomenon in this case was not paralytic entirely. There is undoubtedly present also an element of incoördination.

Dr. Charles K. Mills replied in the negative to Dr. Dercum's statement that he understood that Dr. Mills was a convert to Marie's conception of anarthria and aphasia.

Dr. William Drayton, Jr., reported a case of spasmodic torticollis.

Dr. F. X. Dercum said that he remembered having some years ago had a number of these cases operated on by Dr. Agnew by resection of the spinal accessory nerve. He recalled particularly one old man of the group in whom the spasm was as bad soon after the operation as before, which was not an unusual experience. Dr. Dercum gave the man some powders of chloride of sodium as a placebo. The result was immediate cessation of the spasm. Suggestion may play an important rôle in the treatment of some of these cases.

A CASE OF OCCUPATION PALSY OF THE ANTERIOR TIBIAL NERVE (FLOUNDER FOOT)

By Charles W. Burr, M.D.

W. B., male, 46 years old, bookbinder by trade, but a good bit of a wanderer and jack of all trades, was admitted to the Philadelphia General Hospital, November 8, 1913, complaining of pain in the right great toe and of trouble in walking because of weakness of the right foot. His past history revealed nothing of interest save that gonorrhea was admitted, syphilis denied and alcohol confessedly used in larger or smaller quantities as opportunity offered till about four months ago. Two and a half months before admission and on recovering from a pretty prolonged drinking bout he went to work on an oyster boat as a sorter. His work consisted in squatting many hours a day, the left sole firmly on the ground, the left buttock resting on the back of the upturned right heel, the right knee strongly flexed and the greatly extended right toes resting on the ground and supporting from the heel a large part of the weight of the body. While in this position he would pick up oysters and throw them into different baskets, depending on their size. Suddenly one afternoon on rising, he found he could not bend his right foot upward and that the foot dropped so he could scarcely walk. To use his own words, "the right foot flopped around." His fellow workmen told him that he had "flounder foot," which, according to his statement, is a not uncommon transitory trouble among oysters sorters. The name is rather apt and one which fishermen would be likely to think of. After many days he drifted to Blockley, and on examination Dr. Burr found the following condition. He walked with a distinct right-sided foot drop. The left leg was normal in all ways. There was no trouble either motor or sensory in the arms. He could stand on the toes of both feet and on the heel of the left but he could not flex the right foot at all. The toes of the right foot he could (he said that at first and for some days he could not) extend fairly well. There

was both spontaneous pain and pain on pressure in the right great toe. There was no muscular wasting. He controlled the bladder and rectum well. Both plantar jerks were very active but normal in direction. Both knee jerks were active. The Achilles jerk was present. There was no ankle clonus, nor spasticity in either leg. He showed no general signs of recent alcoholism. There was some pain on pressure over the right anterior tibial nerve. The Wassermann reaction was negative. He became restive under hospital restraint and left in two weeks quite a good deal improved but still having a slight foot drop.

His trouble was manifestly a local one, due to disease of the anterior tibial nerve, and not the result of any general infection or poison. Dr. Burr had no doubt that the cause was the restrained position in which he remained for so many hours day after day. Since seeing him, he had been told by another oyster man that "flounder foot" does occur occasionally among men working on the boats. The only interest in the case is that it adds one more to the long list of occupation neuritides.

IMPRESSIONS OF THE RECENT (SEVENTEENTH) INTERNATIONAL CONGRESS OF MEDICINE WITH ESPECIAL REFERENCE TO NEUROLOGY AND ITS REPRESENTATIVES,—WITH REMARKS AND COMMENTS ON SOME OF THE MORE IMPORTANT SUBJECTS PRESENTED

By Charles K. Mills, M.D.

Dr. Mills referred in his paper to the unusual value of the proceedings of the Section on Neuropathology of the London congress. He recalled the first congress of American Physicians and Surgeons in 1888, referring to it and the recent congress as the most important medical assemblages which he had ever attended. He paid a tribute to Sir David Ferrier, the chairman of the section, who had also been an important personality in the American congress. He was impressed by the evidently great time and labor which had been spent in the preparation of the papers presented. America was well represented in the discussion on the myopathies by a paper of unusual merit from our colleague of this society, Dr. William G. Spiller. References were made to the impressive personnel of the congress in which were included such men of world-wide reputation as Obersteiner, von Monakow, Bianci, Dejerine, Babinski, Bruns, Liepmann, Rothmann, Nonne, Krause, von Eiselburg, Petren, Horsley, Bramwell, Head and many others. Dr. Mills especially reviewed the impressions made on him by four of the great symposiums or discussions, namely, that on the symptoms of cerebellar disease and their significance; that on motor aphasia, anarthria and apraxia; that on the nature of the condition termed parasyphilis; and the discussion at a joint meeting of the Sections on Neuropathology and Surgery on the treatment of tumors of the brain and the indications for operation. Many of the data and theories contributed in these discussions were summarized. Dr. Mills specially commended the merits of the work presented by Rothmann, Babinski, Tournay, Nonne, Head, Mott, Bruns, von Eiselburg and others. Among matters which strongly impressed him were the seriousness, industry and breadth of view of the representatives of neurology at the congress and the striking

manner in which clinical, pathological and experimental work were shown to play their respective parts in advancing neurology.

Dr. Mills spoke of the admirable manner in which the plans for the sections had been arranged, of the excellent facilities furnished for the presentation of subjects and of the generous hospitality of the London neurologists.

Dr. F. X. Dercum said he could second and emphasize all that Dr. Mills had said in regard to the stimulating influence of the congress on himself personally and on the other Americans who attended. It was, for instance, a great pleasure to meet Babinski and to hear him tell that the old order had changed since his own interpretation of hysteria had been accepted in Paris and that "grande hysterie" had disappeared from the hospitals of Paris. In regard to Liepmann's interpretation of aphasia as a subdivision of apraxia, Dr. Dercum thought it was brilliant and agreed entirely with his own conception of the speech function as being an association function, a correlation of sound impressions. Dr. Dercum listened to Dejerine's paper and read it subsequently. To him that paper was a simple reëxposition of the so-called classical theory.

Dr. Theodore H. Weisenburg said that his impressions were not different from those of Dr. Spiller and Dr. Dercum. He was impressed with the fact that in the Section on Neuropathology not a single paper was on functional diseases. He found there was a large feeling against Freud in London. All the papers were organic. The younger men whom Dr. Spiller mentioned were full of their work, and there was not present the spirit of pessimism which is so common in many of the younger neurologists in this country.

Dr. Charles K. Mills said there was not much to say in addition to what he had said in his paper. He would not say anything about the subject of aphasia to-night as that would be taken up at a general meeting in February. One object in preparing his paper had been to excite renewed interest on the part of the society in neurological work by pointing out the value and importance of the work which had been done abroad as indicated by the proceedings of the Section on Neuropathology at the recent congress in London. He did think it was not correct to say that we are not doing anything here and in this society. We have been doing something here in Philadelphia and that something has been recognized by numerous references to it by neurologists abroad, whose compliments he thought were not merely perfunctory. We have, however, shown a tendency at times in our society,—which should be a steady promoter of neurological work, not only in this city, but in this country,—to stale and perhaps become a little lazy.

Dr. Mills said he had heard remarks made by members of this society, and by some outside of it, to the effect that there was nothing in neurology. Such remarks only aroused in his mind a sense of pity for those making them. There is as much or more in organic neurology still to be learned as has been learned in his own time, say from 1875 to the present. Dr. Mills said he had not been a warlike antagonist of his Freudian friends, but he believed it was true, as Dr. Weisenburg intimated, that there had been too strong a tendency to wander into this psychological field to the neglect of more important neurological problems.

In conclusion, Dr. Mills said: "Let us get together and see if we cannot accomplish something more and better during the coming year than we have done in the last year or two."

PITTSBURGH NEUROLOGICAL SOCIETY

JANUARY 27, 1914

The President, DR. THEODORE DILLER, in the Chair

THE SEROLOGY AND TREATMENT OF TABES, PARESIS, AND
CEREBROSPINAL SYPHILIS

By W. A. White, M.D.

Dr. White, by invitation, reviewed briefly the various steps in the progress of the treatment of syphilis of the central nervous system since the discovery of salvarsan, and told the experience which had been had with it, more particularly at the Government Hospital for the Insane. In general, the results in the treatment of tabes were more favorable than the results in the treatment of paresis, probably because the tabetic process is less deep seated and inaccessible. The results of the Swift-Ellis treatment in paresis are uniformly favorable on the laboratory side. There is a prompt reduction in the number of cells in the cerebrospinal fluid, with a corresponding fall in the globulin content and a tendency for the disappearance of the Wassermann reaction. In other words it is possible to make all four reactions normal. In general, however, a cessation of treatment results in a return of the laboratory findings. The clinical evidence is on the whole not as marked as the laboratory evidence, and although improvement does occur, the speaker was dubious as to its permanence. In all probability, the deeper-lying spirochetes are not reached and with a cessation of treatment there is every reason to expect a return of symptoms. Even were it possible to stop the process in the parietic brain it must not be forgotten that a certain amount of destruction must inevitably have taken place which will leave symptoms of defect, of the character of which, however, we have no criteria at present to judge. On the whole, the cases have not been under treatment long enough to warrant any final conclusions. While in paresis the process may not be capable of arrest, still the general result of the new treatment has been beneficial, first, because cases are diagnosed very much earlier, and if cure is going to be possible at all it is only going to be possible in the earliest cases, and secondly, because many cases are diagnosed that used to be thought parietic and consequently helpless.

In discussion Dr. Jacob Rosenbloom said that if the comparative uselessness of salvarsan in tabes and paresis when given intravenously was due to the inability of the drug to pass through the choroid plexus, it might be possible to obtain an arsenic preparation less complex in its molecular construction that might be of value, and he himself was experimenting along these lines.

Dr. E. W. Willetts, speaking of the reactions after giving the Swift-Ellis treatment, said they were ordinarily few and slight, although patients with tabes nearly always have severe pain afterward, lasting for a day or two. The pain of the injection usually passes away in an hour or two. The laboratory findings prove that intravenous injections have no effect on the nervous symptoms, but after the intraspinal injection there is usually a drop of 50 per cent. in the cell count, and it improves with each injection. After a normal spinal fluid appears he has seen it become

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abnormal again, showing a lighting up of the disease process, so that we must not be too sanguine. The big lesson to be learned is to make sure our early luetics are cured by testing not only the blood but the spinal fluid.

Dr. Moyer, pathologist at St. Francis Hospital, said that about fifteen patients at that hospital had been given the Swift-Ellis treatment, one case receiving four injections, which was the highest number any one patient received. In his experience high cell counts drop faster than the low counts.

Dr. Frederick Proescher had experience in treating twenty-five cases of tabes, paresis, and syphilis, and he thought the time was too soon to judge of the value of the Swift-Ellis treatment. He was skeptical, as a salvarsan concentration of 1/5,000 in the spinal fluid could not hurt the spirochete. He was of the opinion that the so-called good results were not due to the salvarsan in the spinal fluid, but to some antibodies which otherwise are not absorbed unless the circulatory means are changed. The most important thing in this whole question is the necessity for early intensive treatment of syphilis itself to prevent involvement of the central nervous system, for once involved, we cannot at present cure it.

Dr. Haythorn, pathologist at the Allegheny General Hospital, has had no experience with the Swift-Ellis treatment. He emphasizes, however, the value of "the four reactions," and said there would be less variations with our Wassermann reactions if we used a quantitative as well as a qualitative estimation. His belief was our real hope for cures was in treatment through the general circulation.

Dr. T. M. T. McKennan spoke of the necessity of being careful in our judgment of the results of the Swift-Ellis treatment, and he thought more light ought to be thrown on cases of "potential paresis," and of paresis with remissions. He has had a number of cases of potential paresis with certain definite physical signs in which fair health has been maintained for a long time before the outburst came. In one case it was fifteen years, in another eight years. If these had been given the Swift treatment we might have drawn false conclusions as to its value. Dr. McKennan spoke also of some difficulties he has had in diagnosis, especially where the clinical findings are not harmonious with the laboratory. In some cases there has been a high cell count, but negative Wassermann in the blood and spinal fluid. So far he has not been sure of distinctive results from treatment, but he is "treating and hoping."

Dr. Murdock, of the Polk Institute for the Feeble Minded, had had no experience in the treatment of cerebrospinal lues by the Swift-Ellis method. He said he saw little evidence of syphilis *physically* in Polk or similar institutions, and doubted much whether the Wassermann test would show a higher percentage of positive reactions among his charges than among a similar number of public school children.

Dr. Lawrence Litchfield detailed briefly the histories of two cases of lues, one of gumma of the brain. He emphasized the necessity of early intensive treatment, and hoped we had some way of knowing positively when a case was cured.

Dr. White, in closing his remarks, stated that while he seemed perhaps over-pessimistic, yet an advance had been made. It is possible now to know definitely the cases of paresis, tabes, and syphilis of the nervous system. In a certain proportion of the last recovery occurs under treatment, and it is in these that he is optimistic. In early days they were not recognized, and the patients were allowed to die as paretics.

Translations

VAGOTONIA

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER, AND DR. LEO HESS

OF VIENNA

TRANSLATED BY WALTER MAX KRAUS, A.B., M.D., AND

SMITH ELY JELLIFFE, M.D.

(Continued from page 173)

3. TONUS AND THE DEFINITION OF THE TERM VAGOTONIA

It is of great physiological interest that the stimulant of the sympathetic nervous system—adrenalin—is produced by almost all vertebrates, and that it lies in close anatomical relationship with the sympathetic system. It is formed just where it exerts its greatest action, since the so-called chromaffin cells, the adrenalin forming cells, accompany the sympathetic in its course. Through the investigations of Ehrmann, we know that adrenalin is continuously flowing from the adrenals and thus exerts a continuous influence upon the sympathetic. From this it must be concluded that the stimulating effect of the sympathetic upon its end organs is not an intermittent one, and only produced when the affected organs become active, but is in reality continuous.

It is probable that a similar state exists with reference to the autonomic system and that a specific analogue to adrenalin, an "automin," exists even though it is not known at present. Substitutes for this are found in certain poisons which have been mentioned—pilocarpin and physostigmin. These drugs act exclusively upon the autonomic system.

In this sense these two substances are valuable substitutes for the supposed physiological "automin." The study of pharmacological substances shows that vagotropic and sympathotropic

activities do not always exert a universal action, but have a special predilection for one or another branch of the two systems. If one recalls that certain physiological hormones, as pituitarin, have also but a selective action on certain parts of one or the other vegetative nervous systems, it is easy to conceive that similar conditions exist in the body, and that many hormones may have definite relations only to a special branch of the two nervous systems.

In studying the interrelations of the activities of the endocrinous glands, it is found, for instance, that the organ which produces adrenalin, the chromaffin system, receives inhibitory influences from the pancreas, since following the extirpation of the pancreas, the chromaffin system (adrenalin) takes the upper hand.⁴ On the other hand a defect or deficiency of the chromaffin system will permit the autonomic system to increase its activity. This is seen in Addison's Disease, for example. The inhibitory as well as the excitatory impulses which are produced by over or under activity on the part of any gland of internal secretion, seem to travel in part by way of the sympathetic system, in part by way of the autonomic system. From this it may be justly concluded that the entire vegetative nervous system is under the control of the glands of internal secretion.

Even if the proof of the existence of a hormone for the autonomic system ("automin") is not as yet conclusive, yet there is no doubt that there is some substance which exerts a continuous stimulating action upon the autonomic nervous system.

It is known that section of the sympathetic pupillary fibers will cause a persistent contraction (myosis), while section of the autonomic fibers will cause a dilatation (mydriasis). Similar results are obtained in many localities in the body where continuous impulses act upon smooth muscle, thus showing that there is a continuous stimulation of both of the antagonistic systems. Under normal conditions these two forces seem to be in equilibrium, a fact which serves to cut off their continuous activity, i. e., the activity of one or another never appears to its fullest extent. Such a continuous activity of nerve impulses on smooth muscle cells is termed *tonic innervation*.

⁴Eppinger, Falta and Rudinger, Zeits. f. klin. Med., Vol. 66, Parts 1 and 2, Vol. 67, parts 5 and 6.

The result of this is an averaging of these antagonistic forces which may approach now one, now the other extreme. In many organs, upon which both systems act, there is no distinct antagonistic musculature, as is true in the case of the pupil, but a single muscle only, and yet stimulation of one or the other system will cause contraction or paralysis. The same thing applies to glandular activity. The many possibilities which may occur in the realm of the two nervous systems will not be discussed. The fact that antagonistic actions may be obtained by stimulation of these two systems must suffice. The impulses arising in the antagonistic systems may vary greatly both in intensity and in duration. The resultant of the two antagonistic forces is a partial measure of the impulses coming from the two systems. These have been shown, by experiments upon animals, to have the greatest variations.

After a lasting stimulation proceeding from one of the two systems has occurred, a different type of equilibrium of the end organs results. From this it is seen that according to the intensity of the lasting nerve impulse, the temporarily varying stimuli which result from the mutual relations of the organs of the body and its food, may be translated, with varying degrees of ease, into mechanical or secretory activity. Thus under certain conditions small stimuli may cause large reactions, either physiological or pathological. This is so because only a little additional influence is needed to produce a noticeable irritation. Furthermore, it is to be expected that trivial and even transitory stimuli, which act upon an already established condition of tonus, may produce prolonged and pronounced results. The antagonistic systems play the very important rôle on the one hand of moderating physiological impulses which might reach very marked intensity, and on the other of preventing acute transitions from rest to excitation or vice versa. Their normal activity therefore subserves the purpose of preventing the functions of visceral organs from going from one extreme to the other.

It is quite possible that in the central nervous system there exists some common center which controls the antagonistic actions of these two systems. It is clear that a disturbance of the antagonistic control may cause a stronger or weaker irritability, or an increased or decreased tonus in one of the two systems,

which may become the basis for the development of a pathological condition.

In the following pages it will be shown how much value this conception may have, not only in the field of general pathology, but also as an aid to the comprehension of various disease pictures. We shall also try to show whether many conditions which, owing to their symptomatology, are called "neuroses" may not be made clear in the light of what has just been said. For clinical reasons it seems best to study first the condition of tonus or irritability of the "autonomic" nervous system.

If at this point one compares the terms tonus and irritability at once it will be seen that they are not identical. Pharmacological experiments show that physostigmin, so far as its effects upon the heart go, only increases the irritability of the vagus and causes no appreciable results unless other stimuli enter. On the other hand muscarin acts as a primary stimulant and causes cardiac standstill without the intervention of other stimuli. Thus physostigmin increases the irritability while muscarin increases the tonus. At this point one must recall another drug, namely strychnin, which only increases tonus, and does not have a direct stimulating effect.

Next considering the observations of experimental physiology, it is found that for physiologists the idea of vagus tonus is an old one. It is well known that in the most varied kinds of animals stimulation of the vagus will cause great changes so far as the heart is concerned. Sometimes a mild stimulus will cause cardiac standstill, while in other cases the strongest induction current will not produce any effect upon the heart. These variations appear even after bilateral vagotomy. Vagotomy itself will sometimes cause a marked tachycardia, while in other instances no influence of the vagus upon the heart rate can be noted. These variations are not only to be observed in different species of animals but even in animals of the same species. The vagi of young dogs and guinea pigs are said to possess great irritability, while those of adult dogs and rabbits possess a low irritability. The term employed to designate this large individual variation is high or low vagus tone. In general, this conception was only applied to the heart, since it is easy to see that much more difficulty attends measurement of the effect of the vagi upon other

organs, and thus knowledge on this side of the subject was much less clear. The experimental methods are in part to blame for this, since narcosis and even curare may cause a great decrease in the irritability of the entire vagus.

Since the conception of vagus tone has been established in experimental physiology and in pharmacology it is not amiss to attempt to apply it to clinical problems. Many observations support the idea that there are individual and varying degrees of tonus of the vagus system in man. The variations in activity of vagotonic drugs afford examples. In many individuals, even small doses of atropin, which cut out already existing vagus impulses, produce marked tachycardia, dry mouth, fever, mydriasis, paralysis of the ciliary body, hallucinations, and sometimes glycosuria. In other individuals, the usual dose is practically without action. Similar variations occur with pilocarpin. One frequently hears physicians complain that many people do not sweat when pilocarpin is given. And other substances which act upon the vagal system, such as digitalis, morphin, scopolamin, hyoscyamin, etc., have varying degrees of action in different individuals. These variations are regarded as idiosyncrasies, by analogy to the varying degrees of reactivity which individuals show to such drugs as iodin, cocain, salicylic acid, etc. We may say at once that these as well as other clinical facts, such as respiratory arrhythmia, habitual bradycardia, etc., have furnished the means of drawing our attention to the variations in the tonus of the vagal system in man.

(To be continued)

Periscope

Allgemeine Zeitschrift für Psychiatrie

(Band LXX, Heft 1)

1. Involutional Paranoia. KLEIST.
2. Attempts at Cure in Two Cases of Syphilis. G. LOMER.

1. *Involutional Paranoia*.—It has long been known that in the presenium, delusional conditions are common, but a definite symptomatology for these psychoses has hardly been constructed, neither has their clinical position been positively determined. From his investigations the author has been led to conclude that in the involutional period there are encountered peculiar, chronic delusion forming conditions which can be divided into two dissimilar groups. The first of these groups corresponds in general with Kraepelin's late form of dementia paranoides ("Presenile Beeinträchtigungswahn"). The condition here is paranoid rather than paranoiac, since, while the delusions are usually of persecution and of grandeur, they are often contradictory, boundless and absurd, so that a delusional system can hardly be predicated. There is also confusion at one time or another and the progressive mental failure is unmistakable. The delusion formation often bears no relation to the affective condition. The second group, with which the author occupies himself exclusively, actually merits the characterization of the "Paranoiac Psychoses." There is here, not a progressive destruction of the content of consciousness manifesting itself behind a paranoid exterior, but a gradual change of the affective attitude, to the surrounding world, a paranoiac change of disposition, which coincides with delusions of persecution, often of grandeur, an alteration which is permanent and causes a certain mental invalidism, but never leads to complete dementia.

The author presents somewhat at length the histories of ten cases, nine of them women, which have come under his observation and proceeds to analyze their symptoms. In these patients he recognizes certain elementary disturbances which he recapitulates as follows:

1. Affective alterations in the sense of a "Paranoiac mixed affect" appearing in many shades, the chief being the affect of mistrust.
2. Misinterpretations, illusions and memory falsifications in the direction of the dominant affect.
3. Hallucinations, chiefly those of hearing, in one case hypochondriac sensations.
4. A peculiar disturbance of the thought process, showing itself chiefly as a combination of inhibition of thought with perseveration and flight of ideas.

Delusion formation is a result of the coöperation often of several of these elementary manifestations to which the accustomed habits of thought and strongly affective conceptions are added. Dementia and confusion of thought content are not recognizable and are not to be postulated in

explanation of the delusional pictures. The differences between the different cases in the direction and the content of the delusions depend upon the different affect-combinations—in depressive, distrustful mood, predominantly ideas of persecution, in angry-expansive mood more ideas of grandeur—in every case upon the varying distribution of the hallucinations and upon the different character of the thought disturbance. The more hallucinations, memory deceptions, flight of ideas or perseveratory disturbances come to the front, the further from the truth the delusional conceptions. The whole disease presents itself symptomatologically, as a qualitative degeneration, going on for a certain time, then remaining stationary, not as a loss of definite capabilities. The disease is much more frequent in women than in men. In eight of the nine women, it began between the fortieth and the fifty-second year. When it once begins, it increases gradually with occasional exacerbations to a certain point and then remains stationary. The evidence does not seem to the author to justify the opinion that this disease depends upon an organic destructive disease of the brain but there is a question as to whether it may not depend upon the changes in the organism which accompany the involution of the sexual glands and presumably the failure of their internal secretion. With regard to the relation of involuntional paranoia to the original mental make-up of the patient, the presence of a hypoparanoiac constitution, and granting that this is present, the causes which lead to the development upon it of the disease, and its relation to classic paranoia and to manic-depressive insanity the author summarizes as follows:

- 1.. There is an abnormal mental constitution characterized by imperious headstrong disposition, sensitiveness, irritability and distrust, the hypoparanoiac constitution.

2. In a certain number of persons of this constitution at the time of sexual involution about between the fortieth and the fifty-second year, probably caused by the changes in the organism connected with the abolition of function of the sexual organs, there is an increase of these abnormal traits to the picture of involuntional paranoia.

3. The elementary symptoms of involuntional paranoia are those given in the previous summary.

4. Its course is gradual with perhaps exacerbations until it reaches a certain point, generally from the forty-eighth to the sixtieth year, when it remains stationary.

5. According to Kraepelin's latest description of paranoia, there occurs before the involution period, a disease meriting the appellation paranoia, and which like involuntional paranoia depends upon an autochthonous accentuation of an already present hypoparanoiac constitution. This early paranoia-like acute and periodic paranoia needs further investigation.

6. The hypoparanoiac constitution and the involuntional paranoia growing out of it, belong together with the hypomanic, depressive and circular predisposition to a great group of abnormal constitutions to which, also, other anomalous predispositions must be added.

The foregoing gives but the barest outline of this comprehensive and important study which should be read in the original by those specially interested.

2. *Attempts at Cure in Two Cases of Late Forms of Syphilis.*—Of two cases, one in which the original diagnosis of paresis was later abandoned in favor of that of cerebral syphilis—the Wassermann reaction was negative, but it was not tried until the patient had already had several

intramuscular injections of salvarsan—failed to improve either under intramuscular salvarsan, old tuberculin, or sodium nucleinate, but under salvarsan intravenously, got well enough to be discharged and to return to work, then following an excess “in Baccho et Venere” had a sudden relapse, and passed later into a quiet demented condition. The second case, one of general paresis, not only failed to improve under injections of sodium nucleinate, but as a result of them had an exacerbation of an inflammatory process at one lung apex and developed an eruption upon the chest which the author regarded as a sort of Herxheimer reaction, while under intramuscular salvarsan this eruption disappeared and the patient's general condition improved to some extent, though his mental powers were not restored and he passed into a quiet dementia. (These cases were treated mainly in the time before intravenous injections of salvarsan had been generally adopted.)

C. L. ALLEN (Los Angeles).

New York State Hospital Bulletin

(Vol. V, No. 4)

1. Nine Years' Experience with Manic-Depressive Insanity. DR. ROBERT C. WOODWARD.
2. A Study of the Deterioration Accompanying Huntington's Chorea with the Presentation of Three Cases. DR. WALTER G. RYON.
3. The Economic Loss to the State of New York on Account of Insanity in 1911. HORATIO M. POLLOCK, Ph.D.
4. Report of Quarterly Conference, December, 1912.

1. *Nine Years' Experience with Manic-Depressive Insanity.*—The writer bases his views upon the analysis of 262 cases and concludes that manic-depressive insanity is merely a clinical conception and that landmarks indicating its boundaries are lacking and that there are no conclusive tests as to what cases are and what are not manic-depressive. Cases grade into all symptom groups. He states that retardation is not a dependable sign. He also demonstrates that manic-depressive insanity has an unfavorable influence upon the life of the individual, and that recurrence always menaces, and if it recurs late in life is likely to render him permanently unfit for duties of life's responsibilities.

2. *Deterioration Accompanying Huntington's Chorea.*—Ryon reports three cases of Huntington's chorea, preceding his case reports with a résumé of various opinions as to the relation of dementia for the neurological disorder. In his summary he makes note of the marked disinclination toward mental exertion. Orientation shows little interference. Memory if sufficiently insisted upon is approximate. Deterioration goes along with the progression of the chorea. There is a marked irritability and transitory persecutory ideas, disappearing upon change of environment.

(Vol. VI, No. 1)

1. Some Preliminary Observations Concerning the Types of Psychoses Occurring in the Individual Members of Families. DR. ARTHUR S. MOORE.
2. The Etiology of Anxious Depressions. DR. ROSS M. CHAPMAN.

3. Training Schools for Nurses in the New York State Hospitals for the Insane. JOSEPHINE A. CALLAHAN, R.N.

2. *The Etiology of Anxious Depressions.*—The author describes eighteen cases of anxiety depressions in which the sexual life undoubtedly played a part, but he does question the rôle as to whether it is a definite sexual etiology or in the nature of a sexual excitement as a part of the psychosis.

FARNELL (Butler Hospital).

Review of Neurology and Psychiatry

(Vol. X, No. 12)

1. The Sensory Fibers of the Phrenic Nerve. G. C. MATHIESON.

1. *The Sensory Fibers of the Phrenic Nerve.*—Dr. Mathieson's experiments were carried on at the Institute of Physiology, University College, London. The article is accompanied by five figures. The author's summary is as follows:

1. The work of previous observers, demonstrating the power of afferent conduction in the phrenic nerve, is confirmed.

2. Stimulation of the central end of the phrenic nerve brings about a reflex rise of blood pressure due to excitation, partly of muscle-sense fibers from the diaphragm, partly of sensory fibers from the serous membranes. Stimulation of the central end of purely muscular nerves, such as the hypoglossal and sub-scapular, evokes a similar rise of blood pressure. The pleura and pericardium have apparently additional sensory fibers to those supplied by the phrenics.

3. Stimulation of the central end of the phrenic nerve brings about an increase in rate and depth of respiratory movements, a result similar to that produced by stimulating any sensory nerve. In no case was any expiratory reflex evoked; sensory impulses passing up the phrenic nerve play little or no part in the normal regulation of respiratory movements.

(Vol. XI, No. 1 and 2.)

1. The Pineal Body: a Review. LEONARD J. KIDD.

2. A Case of Combined Degeneration of the Spinal Cord with Amyotrophy. GORDON HOLMES.

1. *The Pineal Body: a Review.*—This article is concluded from the previous number. It purports to be the only review in English dealing with all aspects of the pineal body. The author states that his object in the review is to so present the subject that we may learn by it the extent and the limitations of our present knowledge of pineal physiology, and may also learn in what directions this may be increased. In the clinico-pathological section he does not concern himself with the purely intracranial signs and symptoms of pineal tumors, but only with the metabolic symptoms shown by about 10 per cent. of the recorded 65 cases.

The author's conclusions are as follows:

1. The facts of comparative anatomy, embryology, histology, clinico-

pathology, and experimental physiology, point to the belief that the pineal body is functional in all those vertebrates which possess one.

2. The pineal body is a metamorphosed organ; not a rudimentary, useless, degenerated, degenerating, or disappearing organ; the phenomena, which have been urged in favor of the latter hypothesis, have been erroneously interpreted.

3. The pineal body probably furnishes an internal secretion; the crucial test for this may prove difficult of attainment; it has not yet been attempted.

4. So far as our at present imperfectly applied experimental studies have taught us, the pineal body of very young birds and mammals has an inhibitory action on the development of the testes and—probably through them—on bodily growth and the appearance of the secondary sexual characters.

5. A relationship of the pineal body with the ovaries is suggested by certain experiments, but has not yet received confirmation from those of Foà (1912).

6. A relationship with the pituitary and the adrenal cortex is probable, with the thyroid and thymus possible; but on these points nothing certain is yet known.

7. Histological studies, and also the most recent experiments of Ott and Scott on adult pinealine (1912), seem to show that, in addition to its prepuberal-sexual function, the pineal body of man and other mammals has at least one other function; it is not primarily, at any rate, a sexual one; and it appears to be active either from puberty to the end of life, or from birth.

8. A true partial pineal involution begins normally in childhood at about the age of seven years, and is normally complete at puberty; its meaning is that the prepuberal-sexual function of the pineal body has come to an end, and therefore involution occurs of those pineal elements which subserve that function.

9. The adult mammalian pineal body seems to have definite actions on some unstriped muscles (Ott and Scott especially), and it is functionally active normally up to the end of life.

10. The neuroglial and connective-tissue elements of the pineal body may have specific functions, quite apart from their purely mechanical rôle; but nothing definite is yet known on this matter.

11. The size of the pineal body bears no relation to the size of the brain or the size of the body.

12. The great variations of the pineal body—sometimes even in closely related forms—suggest that its functions vary, and are relatively greater in some than in others.

13. We are not yet in a position to say how the pineal body functionates.

14. The future of pineal physiology lies probably mainly in the hands of the experimental and chemical physiologist, to a less degree of the pathologist, and possibly to some extent of the experimental embryologist.

15. An exhaustive study of the many methods by which our present imperfect knowledge of comparative pineal physiology may be increased will be found in sections 5 and 6 of this paper.

The article is followed by an excellent bibliography.

2. *Degeneration of the Spinal Cord.*—The case recorded by Holmes was under treatment at the Queen Square Hospital and represents a true combined systemic degeneration of the dorsal columns and of the pyra-

midal tracts of the spinal cord, but this system degeneration was associated with a rapid and progressive wasting of various groups of muscles owing to a primary disease of the cells of the ventral horns. The patient was a man 39 years of age, who, despite the absence of a positive history, had almost certainly had syphilis (positive Wassermann reaction), in whom there developed during a period of nine months before death a symmetrical bilateral spastic paresis associated with extensive muscular wasting and evidence of disease of the dorsal columns of the spinal cord—loss of the sense of position, etc. He also presented progressive mental deterioration, small and irregular pupils which reacted sluggishly or not at all to light, sphincter trouble, dysarthria, and dysphagia. The post-mortem examination of the nervous system revealed chronic syphilitic leptomeningitis over the brain, with but little change in the cerebral cortex, a combined degeneration of the dorsal and lateral columns of the spinal cord, and a primary atrophy of the motor cells of the ventral horns.

The pathological findings are reported, of course, in detail, and there are three illustrations.

C. E. ATWOOD (New York).

Miscellany

EXPERIMENTAL PRODUCTION IN MAMMALS OF THE PINEAL PRECOCIOUS MACRO-GENITO-SOMATIC SYNDROME. Sarteschi, U. (*Pathologica*, 1913, V, December 1, p. 707).

Sarteschi has succeeded in producing bodily overgrowth, with hypertrophy of the testes and precocious sexual development, by means of pineal extirpation in very young rabbits and puppies, as Foà did in cockerels (1912). Sarteschi attempted pinealectomy also in very young kittens, but with constantly fatal results. He used the operative method of Lomonaco: by ligature of the stalk the risk of hemorrhage is obviated, and a temporary ligature of the carotid artery gives an anemic field of operation. Out of 23 rabbits pinealectomized at the age of about 45 days three survived; on autopsy a small remnant of the pineal body was found adherent; the testes were greatly hypertrophied; the animals had grown much more than the controls of the same age. One doe gave birth to young, and one buck became a father. All the organs and internal secretory glands were normal. Sarteschi concluded that in rabbits pinealectomy, whether it be complete or incomplete, determines a great bodily development, sexual precocity, and notable enlargement of the testes. In puppies the operation is more difficult; out of 27, five survived; operation took place at the age of two months. Substantially the same results were obtained as in the rabbits. One male puppy copulated completely at exactly the age of six months, but without fertilization till he was nearly seven months old. It was noted that after the sexual acts he always lost flesh, but his health and nutrition remained good; his testes were of the adult size before he was five months old; on autopsy they were histologically normal. Another male puppy showed at the age of five months great size and adiposity with testicular enlargement: its sexual functions were not tested. In conclusion, Sarteschi "accepts Pellizzi's hypothesis that the pineal body exercises a moderating action on genito-sexual development." Four figures illustrate the testicular hypertrophy and the large size of the fat puppy here mentioned.

LEONARD J. KIDD (London, England).

THESEN ZUM TRAUM-REFERAT. A. Maeder. (Jahrbuch für Psychoanalyse, Vol. V).

Dreams are a mode of expression for the subconscious and represent a real language. This dream language is the "translation" of the elaborated subconscious material rendering it accessible to the consciousness. Dreams are one of the links between the unconscious and the conscious, a link in the chain of these modes of expression (besides play, day-fantasies, monuments of art, visions, etc.).

The cathartic and the teleologic function are functions of the subconscious itself, which are manifested through the above mentioned psychic structures. They are expressed in an especially clear and accessible form through our dreams.

Dreams express autosymbolic manifestations of the actual situation of the libido; which situation is gradually cleared up through this automanifestation and through this struggle for expression. Hence there exists a close relationship between dreams and works of art, the latter being the mode of expression of a chosen few, whereas the dream is at everybody's disposal. The monuments of art possess a predominantly social importance, whereas the meaning of the dream is chiefly individual.

The manifest dream-content acquires an increased significance through this interpretation. There is an intimate relation between the manifest and the latent contents. The sense or meaning of the dream is obtained through the continuous interpretation of the manifest content through the material of the latent content.

The symbols should be interpreted in a prospective as well as a retrospective direction. The prospective grasping of the reality is an important function of the symbolism (mythic stage of understanding).

The two main principles of the psychic adventure show the traces of their activity in dreams: The libido-principle shows intimate relations with the discharging or cathartic function, while the reality principle is closely related to the truly liberating or teleologic function. The latter plays a significant part in the psychoanalytic treatment, or rather in the process of psychic development which takes place in the course of psychoanalysis.

JELLIFFE.

Book Reviews

DIAGNOSE UND THERAPIE DER SYPHILOGENEN ERKRANKUNGEN DES ZENTRAL-
NERVENSYSTEMS. Von Dr. Nonne. Carl-Marhold. Halle. 1.50 marks.

In this little brochure Nonne discusses the diagnosis and therapy of syphilitic affections of the nervous system, and he lays a great deal of emphasis on the diagnostic value of lumbar punctures and the Wassermann reaction. He gives the following table of the typical findings in paresis, tabes and cerebral syphilis.

I. Paresis, or tabo-paresis.

(1) Serum-blood is positive in almost 100 per cent. of the cases.

(2) The Wassermann test in the fluid is positive in 90 to 95 per cent. of the cases with 0.2 c.c. fluid; and in 100 per cent. of the cases the reaction is positive with 1.0 c.c. fluid.

(3) Phase I is positive from 95 to 100 per cent. of the cases.

(4) Lymphocytosis is present in 90 to 95 per cent. of the cases.

II. Tabes Dorsalis.

(1) Serum-blood gives a positive Wassermann reaction from 60 to 70 per cent. of the cases.

(2) The Wassermann test is positive in 20 per cent. of the cases with the original method and in 100 per cent. of the cases the reaction is positive with the increasing quantity of the fluid—(Auswertung Methode von Hauptmann).

(3) Phase I is positive in 95 per cent. of the cases.

(4) Lymphocytosis present in 90 to 95 per cent. of the cases.

III. Cerebral syphilis.

(1) Serum-blood gives a positive Wassermann reaction in 70 to 80 per cent. of the cases.

(2) In cerebrospinal fluid the Wassermann reaction is positive in 20 per cent. of the cases with the original method and again the reaction is positive in 100 per cent. with the "Auswertung Methode."

(3) Phase I is always positive.

(4) Lymphocytosis is usually positive and not infrequently very marked.

Nonne declares that in few instances salvarsan produces better effective results than iodides and mercury, this being especially true of such cases as failed to yield to the latter drugs. This experience, however, is restricted to a small number of cases only—in general it may be said that salvarsan offers no advantages over mercury and iodides. Salvarsan is to be recommended in the gummatous form of cerebral syphilis, but it is especially contraindicated in cases where the vital centers are involved. He uses salvarsan in tabes, in paresis and in the latter he employs large doses.

The student who is familiar with Nonne's works on syphilis will find that the ideas set forth in this monograph are in accord with those expressed in his former works.

M. J. KARPAS (New York).

LEHRBUCH DER SPEZIELLEN PSYCHIATRIE FÜR STUDIERENDE UND AERZTE.
 Von Professor Dr. Alexander Pilcz. Dritte, verbesserte Auflage.
 Franz Deuticke, Leipzig und Wien.

We have had occasion to make comments upon this short text-book of psychiatry. The present edition varies in but few particulars from those which have preceded it. It still reflects the general trend of the Vienna school of the older period. Mania and melancholia remain entities and are very sketchily outlined. Amentia is also retained apart from etiological considerations. Periodic psychoses include a number of recurrent conditions—chiefly the manic depressives of Kraepelin.

The descriptions are sharp and well made; in fact, too sharp and artificial. It is still an anecdotal psychiatry. It deals with the external, superficial features, with no intimation of internal relationships. It is therefore of interest only as a bit of historical material as reflecting the official psychiatry of the schools. The dead body of the Krafft-Ebing dynasty is still utilized as an object of instruction for the youth.

BERICHT ÜBER DIE LEISTUNGEN AUF DEM GEBEITE DER ANATOMIE DES NERVENSYSTEMS. Von Prof. C. Edinger und Prof. A. Wallenberg.
 Fünfter Bericht. A. Marcus and E. Weber's Verlag. Bonn.

The fifth report of the advances made concerning the anatomy of the nervous system, reprinted as a separate monograph, from Schmidt's Jahrbuch, maintains the standard set by the editors of previous reports. Practically nothing of note done in the years 1909 and 1910 has been omitted from this at the same time comprehensive yet succinct summary of the studies made in this field of neurological medicine.

HANDBUCH DER NEUROLOGIE. Herausgegeben von M. Lewandowsky. Vierter Band. Spezielle Neurologie, III. Verlag von Julius Springer.

In many respects this work of 500 pages of the "Handbook of Neurology" is the most striking of all of the volumes of this monumental treatise. It is the most consistent of them all in that it constitutes a review of the neurological disorders associated with disease or defect of the glands of the internal secretions. It is the most original in that it departs from many of the neurological conventions heretofore widely followed and it is the most suggestive in that a glowing, nascent viewpoint is treated by a corps of brilliant investigators.

Hans Eppinger, of Vienna, has written the chapters on Basedow's Disease and Myxedema, both of which show the present-day tendencies to view the disturbances of thyroid activities from the standpoint of the vegetative nervous system. His chapter on the theories of the function of the thyroid is full of stimulus. H. Vogt, of Wiesbaden, has a complete discussion of Cretinism. Eduard Phleps, of Graz, has written the chapter on Tetany. His discussion of the interrelationships of the thyroid, parathyroid and adrenals in the causation of tetany is scholarly. Calcium metabolism and its parathyroid dependence is fully treated.

Arthur Schüller, of Vienna, has written on the Pineal and on Dystrophia Adiposa Genitalis. Both chapters reflect the advances made in the past ten years. Nothing of note has been overlooked. Josef Wiesel, of Vienna, has contributed the chapters on the Adrenals, the Thymus, and Pluriglandular Insufficiencies. The complicated relations of the thymus

are clearly set forth. A. Leri, of Paris, has given the chapter on Acromegaly and with Pierre Marie has contributed that on Paget's Disease. G. Schickele, of Strassburg, has illuminated the difficult question of the menopause, while R. Hirschfeld, of Charlottenburg, has written on Adiposis Dolorosa and its related disorders.

One naturally compares this volume with those of Biedl and Falta, which deal with the same material. To the reader it seems that each volume of this triumvirate is complete in itself. The handbook volume is most valuable from the standpoint of the diseases, Biedl from the attitude of the secretory glands, while Falta occupies a middle ground.

The editor of the Handbook is to be congratulated upon this worthy addition to his undertaking, which promises to be completed with the preparation of another volume.

JELLIFFE.

BERI-BERI. Von Prof. Dr. K. Miura, of Tokio. Alfred Hölder, Wien, u. Leipzig.

Volume 5 of the Supplements to Nothnagel's series is this well-gotten-up monograph of approximately 90 pages. All that is of value is contained herein written by a master hand, a neurologist of note and one in daily contact with this special form of toxic polyneuritis which was recognized in Chinese medical literature as early as the sixth century A. D. The word Kakke is as old in Chinese as the School of Salerno. This was certainly before the days of modern rice-polishing and from this and other considerations Miura rejects the many "food" theories and considers it as an infectious disease. Breast-fed babies have the disease, especially when the mothers suffer from it, and a number of important features concerning its nature are brought out by the author in a very acceptable manner.

JELLIFFE.

AN ELEMENTARY STUDY OF THE BRAIN. By E. W. Fiske, A.M., M.D. The Macmillan Company, New York.

This is a very handy small volume of 131 pages devoted to the general features of the brain anatomy of the sheep. Inasmuch as this kind of brain is easily obtained it is particularly suited for a study of this kind.

The work is specially to be commended for its easy mode of expression. The author has dwelt upon the main features and has woven structure and function into almost a readable book which one could take, not as a dose of anatomy, but as a book of general interest.

Notes and News

PRELIMINARY PROGRAM OF THE AMERICAN NEUROLOGICAL ASSOCIATION

"Remarks on the Symptomatology of Trifacial Neuralgia," Hugh T. Patrick; "Report of a Typical Case of Family Periodic Paralysis with Metabolism Study," Theodore Diller and J. Rosenbloom; "Observations on Epileptics Especially from an X-Ray Standpoint," T. M. T. McKennan, G. C. Johnston and C. H. Henninger; "The Claim of Unconsciousness in Tort and Murder Cases," G. L. Walton; "The Importance of Distinguishing Cerebellar Symptoms in Cerebral Diplegia," L. Pierce Clark and Charles E. Atwood; "The Psychosis of Adolescence," J. Montgomery Mosher; "The Importance of the Bony Sinuses Accessory to the Nose in the Explanation of Pain in the Head, Face and Neck," M. A. Bliss; "Psychoanalysis Considered as a Phase of Education," James J. Putnam; "Four Years' Experience with Salvarsan in the Treatment of Nervous Diseases," Joseph Collins and C. Burns Craig; "Puncture of the Corpus Callosum as a Decompressive Operation," Charles A. Elsberg; "Recent Achievements in Syphilitic Diseases of the Nervous System: A Critical Study," B. Sachs and I. Strauss; "Involuntary Painful Emotional Expression," Charles K. Mills; "Considerations Bearing on the Seat of Consciousness," E. E. Southard; "Post-Litigation Results in Cases of So-called Traumatic Neurosis, Traumatic Neurasthenia, Traumatic Hystero-Neurasthenia, Traumatic Hysteria: Nature of the Affection to which These Terms are Applied," F. X. Dercum; "The Association of Various Hyperkinetic Symptoms with Partial Lesions of the Optic Thalamus," E. E. Southard; "Two Endocrinopathies, and a Point of View," Smith Ely Jelliffe; "The Chronic Progressive Tremor," J. Ramsay Hunt; "The Juvenile Type of Paralysis Agitans," J. Ramsay Hunt; "Spasmodic Closing of the Cerebral Arteries in its Relation to Apoplexy," Alfred Gordon; "The Cortical Connections of the Red Nucleus," LaSalle Archambault; "Carcinoma of the Brain with Autopsy," Edward D. Fisher; "A Case of Probable Encephalitis, Due to the Inhalation of the Fumes of Gasolene," C. S. Potts; "The Central Canal of the Spinal Cord," S. P. Kramer; "Organization of Neuropathic and Psychopathic Hospitals," Richard Dewey; "Pulmonary Complications of Apoplexy," Philip C. Knapp; "Results and Treatment of Syphilis of the Central Nervous System by Salvarsanized Serum," Henry Cotton; "The Early Diagnosis of Spinal Cord Tumors," Joseph Collins and H. K. Marks; "The Cortical Centers for Respiration," T. H. Weisenburg; "The Diagnosis of Cerebral Tumor and Pseudo-tumor of the Brain," John Jenks Thomas; "Report of a Case of Double Alternating Somnambulistic Personality," D. J. McCarthy; "Paramyoclonus Multiplex," Edward M. Williams; "Observations upon Spinal Fluid Cell Counts in Untreated Cases of Cerebro-Spinal Syphilis," H. W. Mitchell; "Subdural Anastomosis of the Anterior Roots of the Spinal Cord," C. H. Frazier and Alfred Reginald Allen; "Cases of Sensory Aphasia," August Hoch; "Recurrent Meningitis, Due to Lead in a

Child of Five," H. M. Thomas and K. D. Blackfan; "The Pathology of Tabetic Ocular Palsies," William G. Spiller; "The Rationale (?) of Intraspinous Therapy and its Effect on Syphilis of the Nervous System," D'Orsay Hecht; "Paralysis Agitans Syndrome with Syphilis of the Nervous System," Carl D. Camp; "Pain in Spinal Cord Tumors, with a Report of Four Cases," Pearce Bailey; "Cerebral Contusion," John H. W. Rhein; "Unilateral Hypertrophy of the Limbs," Howell T. Pershing; "On a Temperature Center in the Brain," Ernest Sachs; "Spinal Decompression in Meningo-Myelitis," Alfred S. Taylor and J. W. Stephenson; "The Treatment of Juvenile Paralysis with Salvarsanized Serum by the Intraspinous Method: Report of a Case," C. Eugene Riggs; "Contribution to the Group of Hereditary Diseases: Progressive Glossopharyngeal Paralysis, with Ptosis," E. W. Taylor; "Intraspinous Salvarsanized Serum ('Swift-Ellis Treatment') in Syphilis of the Central Nervous System," E. W. Taylor; "Physiological Characteristics in Insanity," S. D. W. Ludlum; "Functional Nervous Diseases Met with in School Children and the So-called Nervous Child," J. H. McBride; "Fleeting Attacks of Manic Depressive Psychosis," Menas S. Gregory; "Clinical Manifestations of Lesions Affecting the Fasciculus Longitudinalis Inferior," William Hirsch; "The Roentgenology of Epilepsy," Professor Arthur Schüller, of Vienna (by invitation); an address by Professor Förster, of Breslau (by invitation).

T. G. SELLEW

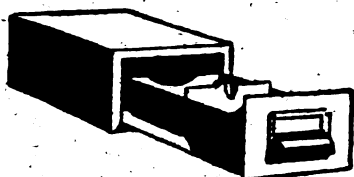
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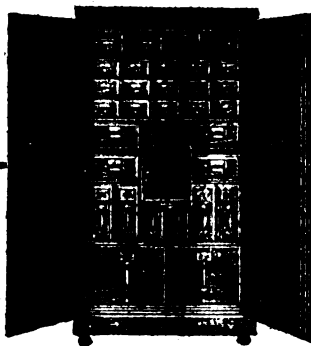
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Original Articles

THE COÖRDINATION OF MOVEMENT

BY WILLIAM J. M. A. MALONEY, M.D., CH.B., F.R.S. EDIN.

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Normal voluntary movements are accurate in direction, precise in extent, uniform in rate, regular in rhythm, and thrifty in force. This composite quality of movement is called coördination, and movements which lack this quality are called ataxic.

A coördinate movement is the result upon the muscular apparatus of the contraction of a series of muscles in regular order, with regular rhythm, and with appropriate strength. Every muscle which participates, contracts at a rate varying from ten to eighteen contractions per second. As the muscles contract, the tendons are pulled upon, some of the ligaments are strained, others are relaxed, the bones move at the joints, and the skin alters in tension. In this function of coördinate movement of the muscular apparatus, skin, bones, muscles, and joints all share.

Some physiologists formerly assumed that the loss of the function of coördination was attributable to and measurable by the loss of sensibility in one or other of the constituent parts of the muscular apparatus; thus, Leyden specifically emphasized the loss of cutaneous sensibility; Goldscheider, the loss of articular; Frenkel, the loss of muscular; and Dejerine and Egger, the loss of bony sensibility. The function of coördination in so far as it depends upon sensibility must depend upon the sensory impulses

arising from every part of the muscular apparatus, and not upon that of the skin only, or joints only, or muscles only, or bones only. The sensibility of the muscular apparatus must be considered as a whole in regard to the function which it exercises as a whole.

Other investigators, such as Erb, Friedreich, and Charcot, did not accept the hypothesis that sensibility is the basis of coördination and showed that ataxia could occur without sensory loss. Jendrassik and Raymond, recognizing the all-powerful influence of mental control over movement, maintained a so-called psychic theory of ataxia.

All the controversy between the upholders of sensory and of motor theories of ataxia is now at an end. The recent brilliant experimental work of a number of investigators, chief among whom is Sherrington, has revealed to us much of the mechanism by which movement is coördinated, and has shown us the truth that is contained in each of these theories.

In this paper I wish briefly to epitomize our present knowledge of coördination. I shall deal first with the afferent impulses from the muscular apparatus and with their distribution, next with their integration at non-sentient and sentient levels, and lastly, with the initiation and control of efferent impulses, both conscious and unconscious.

Kölliker discovered embedded in muscle, certain fusiform structures which Sherrington later identified as afferent receptors, which respond to the stimuli that arise when a muscle contracts, and which are called muscle spindles. Golgi found in tendons, certain other structures which are obviously designed as receptors of traction stimuli. In ligaments, synovial membranes, and cartilage, analogous receptor structures occur. These receptors are attuned to receive afferent impulses which originate in the muscular apparatus. These afferent impulses underlie the conscious and unconscious control of all movement and are distributed throughout practically the whole central nervous system.

From the muscle spindle, a nerve fiber passes to a cell in the spinal ganglion on the posterior root. The axon of this spinal ganglion cell enters the spinal cord as the posterior root fiber. This fiber divides in the cord into an ascending and a descending branch, each of which gives off many collaterals. One of these collaterals is called the reflex collateral. Traversing the spinal gray

matter from behind forwards, this reflex collateral forms mediately or immediately a synapse with the dendrites of a cell in the anterior horn. The axon of this anterior horn cell is the motor or efferent neuron, and passes to the muscle whence the afferent impulse came, where it terminates in the motor end plate.

From the muscle receptor, stimuli arising in the muscle pass by the afferent nerve, through the cell on the spinal ganglion, through the posterior root, to the posterior horn of the spinal cord, and thence, through the gray matter to the motor cell of the anterior horn which corresponds to that muscle. From this anterior horn cell, along the motor neuron, which terminates in the motor end plate, impulses are discharged which initiate muscular changes. We have now traced an afferent impulse in its transit through a simple reflex arc. But a single detached reflex arc is merely a physiological abstraction. The isolation of a nervous act is scarcely possible. The nervous system responds as a unit to peripheral stimuli.

Continuing to trace the afferent fiber from the muscle receptor, we find the descending branch of the posterior root fiber by means of collaterals is ultimately linked with the anterior horn cells which preside over the destinies of adjacent and allied muscles. Collaterals from the ascending branch are similarly distributed. Afferent impulses which are never sentient are thus allotted among the cells of the spinal cord so as to make possible the reciprocal innervation, reinforcement, inhibition, and irradiation by which reflexes in the same segment are correlated and reflexes in different segments are integrated, so that nervous action is unified. Such correlating effects as the reversal (*Umkehr*) reaction, the relaxation of the antagonists when the agonist contracts; and the activating of synergic muscles, that is, muscles which affect the same bony lever or levers consonantly, are thus rendered possible. These coördinating effects are possible not only because of the distribution of the afferent impulses among the segments of the cord, but also because all efferent impulses leave the cord only by the lower motor neuron, the *final common path* of all motor results of nervous activity.

The ascending branch passes up in the homolateral posterior columns to the nuclei of Goll and Burdach; the fibers from the leg pass by way of Goll, those from the arm, by way of Burdach. In the posterior columns, these fibers are associated with the others

arising from the receptors in the skin over the muscle, from the bone upon which the muscle rests, and from the structures around the joint which the muscle moves. From the cells in the nuclei of Goll and Burdach, a second relay of fibers conveys the posterior column impulses to the cells of the medio-ventral nucleus of the contralateral optic thalamus. The impulses then pass by a third relay of fibers, from the optic thalamus to the cerebral cortex.

Some fibers from the nuclei of Goll and Burdach go, mainly uncrossed, to the middle lobe of the cerebellum. The ascending branch gives off collaterals of which certain go to the cells of the ipsi-lateral columns of Clarke and Stilling. The columns of Clarke and Stilling give origin to the tracts of Flechsig and Gowers, respectively. These tracts form the second relay for the impulses conveyed by the ascending branch collaterals, and end in the cerebellum. The second relay fibers in any series concerned with a function may be anatomically intact, yet physiologically demolished, if the first relay is destroyed; and if the second relay of fibers perish, the first relay is physiologically non-existent, to the extent to which their function is dependent upon the impulses conducted by the second relay. Thus, in tabes, the destruction of the collaterals from the posterior root fiber to the columns of Clarke and Stilling is physiologically equivalent to a lesion of the tracts of Gowers and Flechsig; in Friedreich's ataxia, integrity of the muscle afferent fiber and its collaterals does not avail to procure coördinate action in movement, because there is a lesion of the second relay, the afferent cerebellar, and movement is ataxic to the extent to which coördination depends on the afferent cerebellar impulses. Similarly, a destruction of any relay of fibers must act as a lesion of the preceding and succeeding relays, to the extent that the function of the preceding and succeeding relays is dependent upon that of the injured relay.

The afferent impulses from the muscular apparatus (muscle, tendons, joint structures, bones, and skin) pass, therefore, in part, to the motor cells of the anterior horn of the cord. The impulses belonging to any one segment radiate to other segments. In addition to the segmental and intersegmental distribution in the spinal cord, these impulses go by two paths to the cerebellum. One path runs by way of the collateral, to the columns of Clarke and Stilling, thence to the tracts of Flechsig and Gowers, and ultimately to the cerebellum. The other passes by way of the

dorsal columns, through the restiform body to the cerebellum. This second path to the cerebellum is the lesser in importance. The cerebellar paths are chiefly homolateral.

In addition to the intersegmental and cerebellar destinations, the afferent impulses pass to the optic thalamus, and thence to the cerebral cortex.

Sherrington has differentiated the organism with regard to afferent impulses into three fields: extero-ceptive, proprio-ceptive, and intero-ceptive. The extero-ceptive receptors respond to the stimuli arising from the environment of the organism, and are embedded in the surface layer of the organism. The proprio-ceptive receptors are situated within the organism, and respond to "the changes going on in the organism itself, particularly in its muscles and their accessory organs (tendons, joints, blood vessels, etc.)." The intero-ceptive receptors are situated in the internal surface of the organism, a surface which is usually alimentary in function. Here we are concerned mainly with the impulses arising from the proprio-ceptive receptors.

The correlation of the proprio-ceptive impulses from the muscular apparatus takes place at three distinct levels; first, at the level of the segment to which the muscular apparatus initiating the impulse belongs. At this level, the trophic influence of the anterior horn cell is exerted upon the muscle, and the muscular tone is maintained. The impulses here concerned are wholly reflex and never sentient.

The next level may be said to consist of all the body segments. It comprises the whole musculature with all its proprio-ceptive receptors, including the great vestibular organ of tone, and the cerebellum, "the chief coördinative center, or rather group of centers of the reflex system of proprio-ception." This great mechanism, not only in its entirety, but also in its parts, shows to a superlative degree, the integration of reflex action by which muscular activity is unconsciously coördinated. The single segments are as units in a hierarchy of which the head segment is chief and in which the segments increase in functional importance the nearer they are to the head segment.

At the third, or conscious level, movement may be initiated or inhibited; and may be controlled especially in the general spatial qualities. Arrangements therefore exist for distributing throughout the cord afferent impulses which are never sentient, and

throughout the brain, afferent impulses which may become conscious. When some of the impulses which subserve a function are never sentient and others are sentient, an hypothesis regarding that function, which is based either exclusively upon the impulses underlying the conscious, or exclusively upon those underlying the unconscious part of the function, is obviously untenable. Hence, the so-called sensory and motor theories of ataxia must be abandoned.

So far, thanks chiefly to the wonderful researches of Sherrington, the mechanism of coördinate action is intelligible. But, of the third or conscious level at which the impulses are integrated, we know little. The problems involved belong mainly to the realm of the experimental psychologist.

The path to consciousness via the dorsal columns and the optic thalamus was thought by Egger to be the afferent limb of a reflex which initiates volitional movement. He identified the efferent limb of this higher reflex with the pyramidal tract fiber which passes from the cell in the cortex of the precentral gyrus, through the corona radiata, internal capsule, crus cerebri, pons, and medulla, to the motor cell in the anterior horn of the spinal cord of the opposite side, or to its homologue among the basal nuclei. But this conception of Egger does not explain the mechanism of the psychic power over movement. Sherrington, Head, Rivers, and Holmes have begun the bridging of the gap between the sensory impulse and the sensation which it evokes. Just as Sherrington traced the unconscious reflex integration of activity, so have Head and his collaborators endeavored to trace the synthesis of sensations.

All the afferent impulses reach the spinal cord by way of the afferent or sensory nerve through the posterior root fiber. At the periphery, sensibility may be differentiated into epicritic, protopathic, and deep sensibility. In transit from periphery to posterior root, certain rearrangements take place in the fibers conducting afferent impulses, so that the peripheral nerve may be distinguished as the unit of epicritic sensibility, the posterior root as the unit of protopathic. In the dorsal columns of the cord, yet another rearrangement occurs. The fibers conducting impulses of the same order of sensibility become grouped together. For example, in the cord, no such separation exists as at the periphery between fibers subserving the tactile and pressure elements of

pain; all pain fibers are grouped now together; in the cord, morbid changes affect all forms of painful sensibility together. Similarly, the impulses underlying postural recognition, and spacial discrimination are grouped together and pass in the homolateral dorsal columns. From the nuclei of Goll and Burdach, the second relay fibers pass to the opposite optic thalamus; the impulses underlying recognition of posture and of passive movement are in this transit separated from those dealing with spacial discrimination and the appreciation of form.

After exciting the essential center of the contralateral optic thalamus, sensory impulses pass to the cerebral cortex, by the third relay of fibers, in five main groups. Of these groups, one consists of the impulses which underlie postural recognition and the appreciation of passive movement, and another consists of the impulses upon which spacial discrimination depends. In lesions of the cortex, if any change of sensibility occurs, the recognition of posture and of passive movements is affected; sensations whose origin lies in the distal joints of a limb are more affected than those which arise from proximal joints; the appreciation of movement is usually affected to almost the same degree as the appreciation of posture, and persistence of sensations and hallucinations of movement occur.

The afferent impulses underlying sensations of posture and movement are grouped definitely before they reach the cortex. In the cortex, these impulses are associated to produce sensations. These sensations in our past experience once were conscious, but now are only potentially so. By their association in the cortex with the analogous memory images that compounded former experiences of the same order, perceptions of posture and movement are evoked. Postural perceptions, when fully elaborated, may thus comprise all the visual, motoric, spacial, emotional, and other attributes of posture, although in certain individuals and under certain circumstances, one or other of these attributes may be specially emphasized.

When the whole muscular apparatus is at rest, afferent impulses from it are constantly passing along the three relays of sensory fibers, are constantly exciting images of the posture of the whole body. From the association of present with past postural images, the identity and difference of new postural images are detected. Of the absence or presence, the degree and

quality of change in the myriad of postural images, we are not conscious. Only the intrinsically dominant image or the resultant of several images may reach consciousness. The dominance or lack of dominance of an image is something which may be inherent to that image; for example, an unusual change of posture, a change either unusual in extent or performed at an unusual rate, may command attention; but, as a rule, dominance depends not only upon the inherent qualities of the image, but also upon the state of the associations at the moment that the image arises. In the association sphere we know that the eliciting of one image of a series of images which are habitually associated together tends to elicit the others of that series and not an alien image; that the suppression of one image of a series of images which are habitually associated together tends to suppress the whole series; and that the more associations an image has, the more does it tend to persist and the more difficult is it to suppress. Hence, the fate of the postural image depends upon the success of the competition for attention between that postural image and the images which on its entrance are enjoying conscious attention.

In changing from one posture to another, many of us are conscious only of the initial and final posture. The intermediate postures are unconsciously assumed, although by slowing the rate of change or by arresting the change at intervals, we may become conscious of the series of successive postures which are comprised in the whole change. The images of these successive postures are by practice engraved on our cortex as are the *eingelehrnte reihe* of word, figure, and other associations. Every successive posture awakens images of the preceding and succeeding posture and the one follows the other with mechanical precision, without the guidance of consciousness.

Throughout the investigations of Head and his colleagues, and other workers, the intimacy between the impulses underlying the perception of change of posture and those concerned with movement was always evident. This intimacy is not remarkable, if we consider the genesis of voluntary movement. The infant moves, a certain new posture is assumed, and a desire is fulfilled. Just as in infancy, so in adult life, an hallucinatory (desired) postural image can evoke a motor image which will consciously produce a movement that more or less corresponds to the wished-for posture.

A postural concept is thus from the first associated with a motor image; a motor concept with a postural image. A motor image is an essential attribute of every postural concept; a postural image, an essential attribute of every motor concept. Motor images are a greater aid to postural concepts than are postural images; this is probably the reason why appreciation of posture is more delicate in the large proximal than in the small distal joints. In the same way that postural images are associated, so also are motor images; the awakening of one motor image awakens those habitually associated with it.

But besides the association of postural and motor images, suppression of these images occurs also in the cortex. This suppression may occur unconsciously, as the result of competition between images for attention; and as the result of an inhibitory effect which succeeding psychic acts tend to exert upon their predecessors and which is called retro-activity. It may also occur as the result of a conscious act, of an effect which is initiated in the sphere of the concepts, and which inhibits the associations which lead to perception and reproduction. This conscious suppression may vary in degree, and may exercise a selective power upon all postural and motor images.

In the cerebral cortex, not only do impulses awaken images of movement and posture, not only are these images associated with one another and with other closely allied images of posture and movement, but the result of their association tends to be reproduced as movement.

The motor images are linked with the motor cells in the Rolandic area. From these motor cells axons pass by the pyramidal tract, to the motor cells in the anterior horn and to their homologues among the basal nuclei. Just as the axon of the anterior horn cell is the final common path of all motor activity, so is the pyramidal tract fiber the penultimate common path of psychic activity. The results of innumerable unconscious and conscious associations excite motor images; the dominant of these prevail; stimulate the cells of the motor cortex in a definite order, intensity, and pattern, and the impulses thus awakened pass to the lower motor neurons and excite co-ordinate action.

Just as the postural images which become conscious are merely the dominant among the postural images of the whole

muscular apparatus, so the motor effect which we perceive is merely that of the intrinsically dominant motor image, or the resultant of such images.

The motor action in its various qualities is the resultant of the effects of the motor images which are exciting and inhibiting the activity of the Rolandic area cells at the moment. It has not yet been proved, although it seems feasible, that these cortical motor cells have not only a definite threshold above which they must be stimulated to procure evident action, but also have a latent period within which they remain refractory to stimulation, and thus permit the rhythmic and orderly discharge of the affect of motor images.

Electrical stimulation has shown that the reactions of the motor cortex are very similar to those elicited through the spinal mechanism by reflex stimulation in absence of all cortical influence. The motor reactions of the cortex show reciprocal innervation, and other phenomena, which we have mentioned while dealing with purely reflex movement. The movements excited from the motor cortex are divided by Sherrington into three groups: "In one group, movement evoked from the cortex of one hemisphere seems a fraction of the natural movement, the natural movement requiring in its completeness the corroboration of the symmetrical area of the cortex of the opposite hemisphere. In a second group, instanced by conjugate lateral deviation of the eye-balls toward the opposite side, it is equally obvious that the reactions of symmetrical areas of the right and left cortices are related to one another as antagonistic reactions. In a third group of cases, the reactions of symmetrical cortical areas, right and left, seem neutral to one another. Thus, with the area which yields movement of the thumb, that reaction seems neither to reinforce nor to interfere with the similar reaction evoked from the identical area of the opposite hemisphere."

Till now we have dealt solely with motor responses to peripheral sensations, but movement may occur in response to affective states arising in the course of intellectual processes which are not directly evoked by impulses of peripheral origin. Muscular action is a form of emotional response. No emotion can occur without, in some way, affecting the musculature. Thus, excitement may give rise to gesticulation, anger to trembling, and fear to unsteadiness. The mode of action of these

affective states is not clearly known, but the result is a matter of everyday observation. The emotion acts as a "set," facilitating only concepts of the order characteristic of the prevailing emotion. These concepts in other experiences have exerted active excitatory and inhibitory influences upon the primitive engraved images of motor action. The concepts which are allied probably possess allied affects. While such affects are active, the normal automatic association of afferent impulses may be either inhibited or accelerated, and hence the emotional state may be indirectly reflected in movement. Either favorably or unfavorably, the perfection of concomitant movements may be thus influenced; or movements, almost wholly emotional expressions, may occur.

When, owing to functional or organic causes, the elaboration of sensory images is interfered with, the results noted by Head and others upon the perception of motor and postural sensations arise. Perceptions of posture and of movement, if faulty, are faulty to more or less the same degree. But in spite of this faulty perception, habitual movement may not be obviously disturbed.

The associations between a postural and a motor image, and between a motor image and its externalization, being fixed by the mordant action of frequent repetition from early infancy, are primitive, engraved associations, and enable the motor externalization of such associations to occur more or less faultlessly in absence of conscious supervision. Indeed, it is well known that gross movements until they can be performed without conscious control tend to be clumsy, and, in spite of cortical lesions affecting the impulses which underlie the appreciation of posture and movement, may still be performed coördinately and correctly.

When a cortical lesion affects the Rolandic area, the appreciation of posture and of movement may be little interfered with, but the voluntary performance of movement is then greatly restricted or rendered wholly impossible. The awaking of postural or motor concepts and the association of these concepts proceeds uninterrupted, but the link between the motor image and the reflex mechanism necessary to perform the externalization of that image is broken. Under these conditions, not only does immobility arise, but a great increase of tone occurs in the immobilized muscle. This increased tone is evidenced in rigidity affecting mainly the flexor groups, and as this rigidity persists in

spite of the destruction of the cortex, it must be of subcortical origin. Hughlings Jackson, Sherrington, and others have shown that the rigidity is dependent upon the loss of cerebral control over the proprioceptive impulses. The cerebrum exerts an inhibitory influence on muscle tone, and thus permits of phasic alterations in that tone, such as are necessary for conscious action; whereas, the cerebellum exerts a tonic influence upon muscle tone, such as is necessary for automatic action.

Consciously we can move and inhibit movement; we can control the gross rate and force of a movement; we can control the gross spatial qualities of a movement: consciously, we do no more. The force, the rhythm, the rate, and the synergic quality of muscular contraction in the course of movement are as a rule unconsciously controlled.

But we have consciously acquired movement; we have consciously learned to subjugate to our will the various qualities of the muscular apparatus displayed in movement. So long as the connection between our will sphere and the lower motor neuron, the final common path of the afferent impulses from the muscular apparatus, remains intact, there is no reason why purposeful movement should not be acquired.

In the ataxia of tabes, it is mainly reflex integration which is faulty. The peripheral, spinal and cerebellar components of coördinate movement may all be affected. False postural and motor images arise, "interfere" with those engraved in memory by practice, and hence derange the psychic component and produce chaotic effects in the externalization of movement: but the psychic common path,—the Rolandic area, and the tract from it—remains unaffected. There is no reason why we should move only at the dictates of the habitual postural images which have been engraved upon the brain by practice. There is no reason why ataxics cannot acquire new perceptions of posture from the sensations which actually persist, why they should not learn to associate these sensations with appropriate motor images and why these motor images should not be properly externalized in coördinate movements. This process of acquiring coördinate movement is aptly termed reëducation. Obviously, it is a conscious process. Sensations from the muscular apparatus must be consciously perceived, and consciously identified with the posture and movement which underlie them. The coördinate movement must be per-

formed for the ataxic, so that he may realize the sentient elements in it, and learn to identify it from them. From this identification, a reproduction follows, for the motor images are still linked by their usual channels with the exterior. The success of the whole process of reëducation of the ataxic therefore rests upon his ability, first, consciously to attend to the sensations which underlie movement; second, properly to interpret these sensations; and third, to link these perceptions with their appropriate motor images. Experience teaches us that if this art be consciously acquired and assiduously practised, it will gradually be relegated from a wholly conscious to a largely unconscious performance.

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SYPHILITIC TESTS IN LATENT AND TREATED SYPHILIS¹

BY E. P. CORSON-WHITE, M.D., AND S. D. W. LUDLUM, M.D.

One of the most definite characteristics of syphilis is the complete disappearance of symptoms at certain periods, giving rise to a state of apparently perfect health. This condition described by Ehrlich as a "non-sterilizing immunity" may occur spontaneously or as the result of treatment, and it may last for years. For the safety of the patient the true significance of this period is most important. The continued existence of the organism renders the individual always liable to recrudescence of the infection and possibly to the more serious ravages of para-syphilitic diseases.

During the last few years the Wassermann reaction has been used in the diagnosis of many cases, in the demonstration of the origin of many chronic conditions and in the solution of various other problems. The voluminous literature on the subject shows that in the so-called latent periods of syphilis with apparent health only about thirty per cent. of the cases give negative results. Donath (1) has described what he calls a provocative treatment. This consists in the administration of a short course of mercury or a small dose of salvarsan or neosalvarsan. Apparently this procedure has no effect on the nonluetic serum, but changes about nine per cent. of the negatively reacting serums to positives. Donath himself says the influence of the treatment was similar to that of quinine on latent malaria. It has been explained by others in several ways; namely:

(a) The liberation of endotoxins by the immediate destruction of a small number of spirochetes gives a sudden intense stimulation to antibody formation.

¹ Work done in the Laboratory of Neuropathology of the University of Pennsylvania and in the laboratory of the Philadelphia Orthopedic Hospital and Infirmary for Nervous Diseases.

(b) The dose of spirillicide insufficient to kill the treponema actually stimulates their activity.

(c) The endotoxin liberated from the dead organisms gives rise to that substance in the serum on which the Wassermann reaction depends. Most of the other laboratory methods as the demonstration of the spirochete, or the inoculation of animals, etc., fail at this time.

The luetin test devised by Noguchi, besides the decided advantage of a true specificity, gives the most constant results in tertiary latent and late hereditary cases. The technique of this test consists in the intradermal injection of killed cultures of several strains of *Treponema pallidum* and a control injection of sterile media. In a syphilitic individual this treatment gives rise to a reddish indurated papule or pustule, often surrounded by an inflammatory area. This inflammation increases for four or five days and then gradually recedes. An inflammatory area may sometimes occur around the control injection. The "Umstimmung" of Lesser. This last is probably due to that increased irritability noticeable in the skin of many syphilitics, while the first, which is always more severe than the control (when the control shows anything at all), is probably a true allergic condition similar to that found in von Pirquet's reaction for tuberculosis.

The importance of a true interpretation of the position of the apparent clinically well individual with syphilitic history, early led many to use the Wassermann reaction to determine whether the facts described in Colle's and Profeta's laws were due to a real immunity or to a latent infection. Opitz (2) was the first to use it for the study of syphilis in women and newborn children. His results stimulated much careful investigation of the field, by means of the complement fixation tests, demonstration of spirochetic and microscopic examination of tissues.

Plaut (3) in his investigation of the rôle of syphilis in the production of feeble-mindedness studied many complete families including those of paretics and tabetics, finding the majority of the members of these families infected. His series unfortunately included only those in which some mental or nervous defect was present in at least one member of the family. In several families with a positive history present in one parent he found that the children clinically positive gave practically always a positive Wassermann reaction, and the reaction was positive in many

members of these families that were apparently healthy, but negatively reacting children were also found. These negative results appeared as a rule at one or the other end of the line, although in some cases the negatively reacting child might be between two positives. Knoppelmacher and Lehdorf (4) found that fifty-six per cent. of the mothers of syphilitic children were positive and many more reacted positively if tested within a few months of the babies' birth. Müller and Reich (5) found negative reaction in some children of syphilitic mothers, and Boas and Thomsen (6) in a similar series found that some children which were negative at birth became positive later. Baisch (7) made a very complete study of 140 mothers of children manifestly syphilitic or showing spirochetes in the tissues. He obtained a positive Wassermann reaction in 102 of these women, and demonstrated the *Spirochæta pallida* in the maternal position of the placenta in twelve of the negatively reacting mothers. He concludes for his study, and it certainly appears from most of the evidence, that the mothers of syphilitic children and the children of syphilitic parents are really infected, fifty-two per cent. of the cases giving positive Wassermann results with the original Wassermann technique, a result which can be slightly increased with the one unit or the Noguchi technique. The true position of the negatively reacting children however is not definitely cleared up by the Wassermann reaction.

It is impossible to accurately state the length of a latent period. A positive reaction may be obtained when the resistance of the body is lowered by some cause or other and the latent individual develops an active syphilis.

In treated cases, having once had a positive reaction, the quantitative reaction is the best index of the intensity of disease and of the effect of the treatment.

Citron (8) was the first to study the effect of treatment, finding a loss of the reaction in sixteen per cent. of the cases. The change varies in different individuals, disappearing quickly in some and persisting even after rigorous treatment in others. Irregular and inadequate treatment never gives rise to negative results. There is a tendency in most cases for the reaction to disappear with continued treatment and to reappear if treatment is discontinued. With salvarsan and neosalvarsan most of the reports are studies of the effect of one injection. The most in-

teresting of these investigations were those of Noguchi and Bronfenbrenner's (9) quantitative study of 102 serums, before and at weekly intervals after the injection of salvarsan, and Craig's (10) analysis of 225 cases according to stage of disease, intensity of reaction and method of treatment. These reports show that the reaction may become negative in from ten to thirty days after the injection, usually in the third week, and that a large percentage of these negatives relapse. In all cases there is a *definite quantitative* reduction in the strength of the reaction, more marked in primary and early secondaries, at which stage relapses are less frequent. Still more favorable are the early cases with weak positive reactions. The reduction in the reaction is roughly comparable to the clinical response but is in every case slower.

The tables which we submit are collected from the work of the last two and a half years and include cases from many sources. They are grouped to show primarily the significance of negative reactions in families of infected individuals (Table I), and in

TABLE I

	No.	Persons	W. R. +	N. R. +	Luetin
Families of syphilitics.....	17	31	26	27	29
TABETICS:					
sterile.....	7	7	1	1	5
c. abortion.....	4	4	1	1	2
children abortion.....	17	47	21	22	22
children.....	8	28	9	11	11
PARETICS:					
sterile.....	4	4	0	0	1
abortion.....	9	9	4	4	4
children abortion.....	3	7	4	5	5
children.....	5	14	2	2	2

apparently clinically well-treated patients with luetic histories (Table II). Incidentally, to demonstrate the comparative serological value of various methods of treatment (Table III). While many patient were examined, we have included only those in which we were able to make a luetin test and in which we had a record of carefully titrated serum reactions over a period of at least three months. The great majority of these cases were those not yielding quickly to treatment (late secondaries and tertiaries) and the rather high per cent. of positives in the treated cases is due to the fact that the titration was as fine as possible and anything not absolutely negative was counted as positive. From

these tables it is evident that the negative reactions occur slightly earlier with the Wassermann technique than with the Noguchi and both give earlier negatives than can be demonstrated with the luetin. Excluding the cases of paresis and tabes in which the

TABLE II

Cases	W. R.	N. R.	Time	Luetin
42	—	—	3 mo.	1—
27	—	—	6 mo.	1-3±
14	—	—	9 mo.	5-2±
17	—	—	1 yr.	11-2±

luetin test results were irregular, we found that every form of treatment reduced quantitatively the antibody content of the serum. The reduction is less marked in cases starting treat-

TABLE III

Cases	W. R.	Treatment	Stage	W. R. +	N. R. +	Luetin
7	xxxx	Hg. inc. 3 mo.	2dary	7 av. x	7 av. xx	7
11	xxxx	Hg. inc. 3 mo.	3-ary	11 av. xx	11 av. xx	11
18	xxxx	Hg. inc. 3 mo.	tabes	1 sav. xx	1 sav. xx	11
8	xxxx	Hg. inc. 3 mo.	paresis	8 av. xxxx	8 av. xxxx	6
12	x	Hg. inc. 3 mo.	2dary	5 av. x	5 av. x	12
9	x	Hg. inc. 3 mo.	3-ary	5 av. x	7 av. x	9
5	x	Hg. inc. 3 mo.	tabes	3 av. x	3 av. x	2
3	xx	Hg. inc. 3 mo.	paresis	3 av. xx	3 av. xx	2
8	xxxx	606.4 inj.	2dary	2 av. x	3 av. x	6
8	xxxx	606.4 inj.	3-ary	2 av. xx	5 av. xx	8
7	xxxx	606.4 inj.	tabes	5 av. xxx	5 av. xxx	5
4	xxxx	606.4 inj.	paresis	4 av. xxxx	4 av. xxx	4
9	xx	606.4 inj.	2dary	0	1 x	4
9	x	606.4 inj.	3-ary	1 av. x	1 x	7
3	x	606.4 inj.	tabes	1 av. x	.....	1
9	xx	606.4 inj.	paresis	8 av. x	9 av. x	3
3	xxxx	914.4 inj.	2dary	2 av. x	2 av. xx	3
7	xxxx	2	3-ary	3 av. x	3 av. x	6
3	xxxx	2	tabes	3 av. xx	3 av. xx	2
3	xxxx	2	paresis	3 av. xxx	3 av. xxx	2
12	x	2	2dary	0	2 av. x	9
8	x	2	3-ary	2 av. x	3 av. x	5
2	x	2	tabes	0	1 av. x	2
2	x	2	paresis	1 av. x	1 av. x	0
14	xxxx	914 Hg.	2dary	2 av. x	2 av. x	8
17	xxxx	914 Hg.	3-ary	2 av. x	3 av. x	8
8	xxxx	914 Hg.	tabes	5 av. x	7 av. x	6
3	xxxx	914 Hg.	paresis	2 av. x	3 av. xx	1
6	xxxx	914-1 mo. hg. 1 mo.	3-ary	2 av. x	2 av. x	6
2	xxxx	914-1 mo. hg. 1 mo.	tabes	2 av. xxx	2 av. xxx	2
3	xxxx	914-1 mo. hg. 1 mo.	paresis	3 av. xxx	3 av. xxx	2
7	x	914-1 mo. hg. 1 mo.	3-ary	1 x	4 av. x	4
7	x	914-1 mo. hg. 1 mo.	tabes	3 av. x	3 av. x	7
3	x	914-1 mo. hg. 1 mo.	paresis	2 av. x	2 av. x	1

ment with strongly positive (xxxx) reactions (over two units) of antibody than in those with weak reactions (x), that is one half a unit or less. It is much less in late stages than in early stages. Slow reductions are apt to be the rule in paresis and occur not infrequently in some cases of tabes. Kaplan (11) called attention to this type, calling them the "Wassermann fast tabes." The most marked reduction in the reaction appears in those cases treated with mercury and salvarsan or neosalvarsan, and next in those with salvarsan or neosalvarsan alone. The difference between those two is slight. Salvarsan apparently acts more rapidly than the neosalvarsan, although apparently the neosalvarsan remains longer in the blood than the salvarsan. Mercury gives a slow steady diminution. The serum in patients after long continuation of any type of treatment may show a progressive slowing of the reduction of the antibody content and in some cases even a stationary period.

In conclusion, negative reactions do not necessarily mean absence of syphilitic infection or cure, even although the reaction has been negative for considerable time, as shown in Table II. The luetin test, the specificity of which has up to date never been disproved, is less easily influenced by treatment and is to-day the best criterion of genuine cure or absence of infection in our hands.

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Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

JANUARY 6, 1914

The President, DR. SMITH ELY JELLIFFE, in the Chair

A CASE OF TRAUMATIC EPILEPSY CURED BY OPERATION

By William M. Leszynsky, M.D.

Dr. Leszynsky presented a man, 30 years old, with a negative family history and whose personal history was uneventful up to the age of six years. At that time he fell from a height, receiving a compound, comminuted fracture of the skull over the right temporo-parietal region. He was taken to a hospital, where he was treated surgically, a section of the bone being removed, and when he returned home, a few weeks later, he was apparently free from all symptoms. A few months later he began to attend school, and ultimately became a bookkeeper.

At the age of 21, fifteen years after the receipt of his injury, he began to develop epileptic convulsions. The attacks were at first infrequent, and always began with a convulsive movement of the left hand, gradually becoming general. For five years he averaged about one attack a month, but they gradually became more frequent and severe, and when Dr. Leszynsky first saw the patient, nearly four years ago, he had recently had four severe attacks in a single night. Upon examining the cranium, the presence of adhesions over the site of the old wound were suspected, and an early operation was recommended, and this was done by Dr. Henry Roth at the Lebanon Hospital on May 23, 1910. It was then found that the skull, the dura and pia mater and the cortex were matted together in one mass. After some difficulty the cortex was freed and covered with a piece of Cargile membrane and the wound was then closed. The patient's operative recovery was good, and he left the hospital shortly afterwards.

Three years and eight months had elapsed since the operation, and the man had never had an epileptic convulsion since that time. His treatment had been purely hygienic, and he had never received any sedative drugs.

Dr. Arthur C. Brush, of Brooklyn, said the theory promulgated by the late Dr. Ira Van Gieson a few years ago that the epileptic seizures were the result of a wedge-shaped piece of tissue producing irritation of the cortex did not hold good in this case, as nothing was done here but to separate the adhesions and insert a piece of Cargile membrane. Here we either had to accept the fact that the epilepsy was cured by the surgical operation or else that the epilepsy was not due to the injury at all. The fact that the convulsive movements began in the left hand and were followed by unconsciousness pointed to the Rolandic area.

Dr. Leszynsky, in closing, said the character of the attacks was always

the same, invariably beginning in the left hand, extending up the arm and over the rest of the body, with almost immediate loss of consciousness. The patient never had any *petit mal* attacks. The attacks occurred both during the day and at night, and were purely Jacksonian in the beginning.

A CASE OF MULTIPLE SCLEROSIS

By S. P. Goodhart, M.D.

A girl, 24 years old, with a negative family history, seven years ago began to complain of peculiar burning sensations in the palms and soles. Finally, this paresthesia extended to the upper and lower extremities, giving her the sensation, as she described it, as though the extremities were enveloped in gloves. This disappeared, and was followed by a flaccid paralysis of the lower extremities, which practically became complete. At the end of three months she began to improve and three months later the paralysis had entirely disappeared. She then remained well until last July (1913) when she began to suffer from weakness in the left upper extremity, and extending very gradually to the corresponding lower extremity. The eye grounds at this time suggested some change in the disks. In the course of a short time this paralysis, which followed a very suggestive anatomical distribution, was accompanied by a tremor, and the case now presented a typical picture of multiple sclerosis, which was confirmed by the eye findings. There was an absence of the abdominal reflex; a marked Babinski was present on the left side, less marked on the right. The patient had also developed a peculiar spasm of the left hand. There was nystagmus on convergence. The Wassermann was invariably negative.

EPILEPSIES AND PSYCHOANALYSIS: A QUERY?

By Smith Ely Jelliffe, M.D., and Frank M. Hallock, M.D.

Dr. Jelliffe, preliminary to the presentation of a patient bearing on this subject, said we knew so little about the dynamic factors in the causation of the epileptic discharge, particularly in the so-called true or idiopathic type of epilepsy, where we had no antecedent history, and objective neurological examination left us at a loss, that he took occasion to ask Dr. Hallock to investigate some of these patients at the Post Graduate Hospital Dispensary, more particularly in relation to their complex reactions and psychic disturbances, in the hope of eliciting some facts that might be pertinent to or have some bearing upon the particular type of energy discharge. The class of patients he had in mind were those in which the seizures had come on at about the ages of eleven, twelve or thirteen, more or less coincident with the awakening of the influences of puberty and which seemed to be in some manner coincident with the awakening of the masturbatory conflict.

Even from the time of the early Greek writers, coitus has been described as a minor epileptic attack, and the motor manifestations of the epileptic discharge were so striking as to suggest the possibility of such a relationship. Possibly, and the subject is presented to-night in the form of a query, this apparently motiveless discharge of energy may depend upon certain psychogenic factors that were worthy of investigation. We know that during the night, when the usual avenues of energy

dissipation are not open, epileptic attacks are much more frequent than during the day time. It is a familiar fact that in institutions where large numbers of epileptic individuals are grouped, interference with the regular routine employment of the patients, such as that caused by a rainy day, a stormy day, Sundays and holidays, is coincident with an increase in the number of attacks: such attacks occur more frequently when the patients are not discharging energy in normal ways. It might be possible that the rigid application of the libido theory with the psychoanalytic study of the distribution of energy might offer a field in which an explanation for certain forms of epileptic discharge might be formulated.

Dr. Frank M. Hallock said this case was presented very early in the course of the psychoanalysis. The patient was an epileptic boy, seventeen years old, who came to Dr. Jelliffe's clinic at the Post Graduate Hospital on October 15, 1913. His family history was negative. The epilepsy began at the age of eleven years, the attacks occurring about twice a month, without prodromata. They began with twitching of the right hand and occurred only during sleep, lasting from two to twenty minutes. During the attacks, the patient frequently bit his tongue. There were occasional semi-conscious states, with staring and dreamy states, lasting a few seconds or minutes. Occasionally, the boy heard voices; sometimes it was part of a prayer, etc. He also complained of certain insistent words that troubled him for several days.

The boy was unable to work on account of his convulsions; he feared that work might aggravate them, although they never occurred during his waking state. He also had a tendency to hoboism, and had once beaten his way from Springfield, Ill., to St. Louis on a freight train. He had made attempts to hypnotize himself by staring into a mirror until he lost his equilibrium and staggered across the floor. He said he had also tried "stunts" with his eyes to make them come together by holding his finger near the nose in order to make each eye independent of the other. He had done this half an hour at a time.

Inquiries into the boy's sexual life elicited the fact that masturbation began through the instruction of other boys at about the age of eleven, but was stopped by an uncle six months later. Two years ago he again began to masturbate and continued the practice for several months. Other sexual experiences had been slight and there had never been any seminal discharge.

The boy's environment had been a difficult one. When he was a small child, he liked his father, but now he looked upon him as too much of a religious fanatic. This dated back to about the age of ten. "I began," he said, "to read Darwin, but my father was steeped in his old orthodox beliefs and we clashed. He has beaten me plenty of times; ever since I can remember." He was also frequently beaten by the Rabbi to whom he was sent for religious instruction. Of his mother, he said, "I like her pretty fair. She is little better than father. Because he doesn't like me, she does." Of his sister, fifteen years old, he said: "She is my father's pet and I got into many scrapes on her account." The patient had occasional dreams of sexual intercourse with this sister. He had no girl friends.

The patient had many dreams, some of them very intricate. They were full of his struggles with his father. After one of these he awoke, his father shaking him vigorously in order to awaken him, asking what he was yelling about and evidently fearing an impending fit. As the child

advanced in years, he met with decided rebuffs. He sought expression for his love-nature and found his father in the way. As a young child, he knew the world only through father and mother, and it seemed to him to be a pretty tough world. Rather than make any further effort toward understanding his love-life, which demanded expression in some form, he retired to the cradle—to the memories of his infancy and childhood. He dreamed of a nest in his mother's arms, where he would be loved as he was when a baby. One day, after having a fit, he was asked how he felt, and he replied, "I feel like a baby three or four years old. When I am well I beat my own way and do as I like, but now I do whatever my mother tells me. She treats me better than she does the other children. To-day I asked her why, and she said because of my illness." He had thus succeeded in his unconscious object of drawing his mother's sympathy and attention by means of his fits, thus feeling himself once more in her care as he was when a baby.

Dr. Hallock said the analysis of this case would be continued, because, with the understanding of the nature of his conflict, the patient's attitude of mind towards life had already changed. He expressed himself as feeling different and better. The struggle with his environment was not so keen, and his dreams had already shown some change in the direction of an understanding and control of his sexual conflict.

Dr. C. P. Oberndorf asked if the more important signs of the classical epileptic attack, such as the abolition of the corneal and light reflexes while the patient remained unconscious, involuntary evacuation of the bowels and bladder, and the Babinski sign immediately following the convulsion had been recorded in this case.

Dr. Hallock said he could not answer Dr. Obendorf's questions, as he had never seen the boy during an attack.

Dr. Oberndorf said that without an accurate examination during the attack it was impossible to distinguish between epilepsy and the convulsive manifestations of hysterical states or some of the lapses seen in dementia præcox. In one case of convulsive attacks, apparently of psychogenetic origin, which he had observed, there was voiding of the urine, and in another case, in a girl of twelve, the attack culminated in an orgasm. In both instances the attack seemed to be a substitution for masturbation. In the case just presented there was no evidence to warrant the assumption that the attacks, whether hysterical or otherwise, were dependent on either the conscious or unconscious psychical life of the patient, nor had any analysis of the hallucinations been presented.

Dr. Jelliffe said the attacks were accompanied by biting of the tongue and involuntary evacuations of the bowels and bladder, and he had no doubt that they were of the major epileptic type. That the hallucinations had been investigated but that as yet the analysis was far from being complete but had already been of service both from the standpoint of the query raised by the title of the paper and as affording some measure of relief to the patient.

Dr. I. Abrahamson said he could see no possible connection between the epilepsy in this case and the psychoanalysis. Many of the dreams that had been reported by Dr. Hallock appeared to be due to suggestions received from the examiner.

Dr. Hallock said that what was apparent on the surface of a dream was not its real meaning, which was something quite deeper. While his close association with the patient might bring out something, it would have nothing to do with the true meaning of the dream.

Dr. Jelliffe said that while this work was still in an experimental stage, he thought Dr. Hallock had gone quite far enough to show that in this particular case the theoretical importance of the Oedipus complex was demonstrated, and that possibly the motor discharge was in response to the psychogenetic factor of hate to the father and incestuous phantasies regarding the mother. We should not lose sight of the fact that we were merely discussing a form of energy distribution which is described under the symbol of epilepsy. So far as the question of suggested dreams is concerned, Dr. Jelliffe said his experience had been that it was practically nil. The unconscious is occupied with much more important matters than the "suggestions" of a physician. It is the instinctive life that is reflected in the symbols of the dream. As Bergson has expressed it, "Our past, as a whole, *i. e.*, 'the unconscious,' is made manifest to us in its impulse; it is *felt* in the form of *tendency* although a small part of it only is *known* in the form of *idea*."

THE INTENSIVE TREATMENT OF SYPHILIS OF THE NERVOUS SYSTEM BY NEOSALVARSAN, INTRAVENOUSLY, AND MERCURY BY INUNCTION: A PRELIMINARY REPORT

By Frederick Peterson, M.D., and J. W. Stephenson, M.D.

This report was based upon the intensive method of treatment in fifteen cases, as adopted in the second division of the New York Neurological Institute. The assumed principle of the treatment was the cumulative effect of the drug, *i. e.*, before the activity of the drug was lessened by excretion, more was administered, and in this way the patient, by a process of gradual establishment of tolerance, became saturated with the drug in such a manner that the usual untoward effects of the same were avoided.

The method adopted was as follows: 0.45 gm. of neosalvarsan was administered intravenously every third day for five injections. In cases of paresis, tabo-paresis and other actively severe infections, this was supplemented by inunctions of mercury (gr. 40 to 60) on the days the patient did not receive the neosalvarsan. Many, in fact the majority of the unfortunate sequelæ of neosalvarsan, were attributable, in the authors' opinion, to faulty preparation or administration of the drug. They considered 75 c.c. too concentrated a solution of 0.45 gm., and invariably used from 90 to 100 c.c. Freshly distilled water was boiled at least five minutes and then cooled to room temperature by running water. The apparatus used was the ordinary gravity one and the method of administration was as follows: 30 c.c. of lukewarm, previously sterilized normal saline solution was introduced, and as this escaped from the container, the neosalvarsan was poured in, and as the last portion left the container, 30 c.c. of lukewarm normal saline were again introduced. Special care was taken that as small amount as possible of the neosalvarsan solution came in contact with the warm saline, lest the warmth of the latter increased the toxicity of the drug.

In the fifteen cases covered by this report, three were cases of general paresis; four were cases of tabo-paresis; six were cases of tabes, one was a case of cerebro-spinal lues, and one was a case of meningitis, with gumma. One of the cases developed a severe arsenical dermatitis and

resulted fatally. The other cases were uneventful. The immediate effect or so-called reactions following the first series of injections were as follows: It was the usual course with tabetics that the pains were much worse from twenty-four to thirty-six hours after the first injection. After the second injection there was sometimes slight exaggeration; after the third, usually none. In a very small number of cases a chill and slight temperature elevation followed the first injection only. There was no case of diarrhea. In a large majority of cases a slight conjunctival icterus appeared after the third injection, but this was of brief duration. In those cases supplemented by mercury the patient usually expressed himself as feeling very weak after the fourth injection, which was apparently attributable to the mercury. In paresis the mental condition was usually more pronounced following the first injection, but was not so affected by subsequent ones. The illness in the fifteen cases was such that thirteen could not pursue their usual vocation prior to the treatment. Among these thirteen, the improvement following the first series of injections was such that eight returned to their work within six weeks to two months. Four showed slight improvement; two were considerably improved; one died.

Serological results: The serological examinations were made from three to twenty-seven days following the last injection. Of the fifteen cases, the Wassermann was positive in the serum *only* in two cases. One of these remained positive; the other was rendered negative. The Wassermann was positive in the spinal fluid *only* in two cases. Both of these were rendered negative. The Wassermann was positive in the serum and spinal fluid in eleven cases. One of these was not subsequently examined. Of the remaining ten, six were rendered negative, one weakly positive and three remained unaffected. Of these four, after the second series of injections, the weakly positive became negative and of the three unaffected cases one became negative, one remained positive, while in the remaining case he was unable to get a second serology. Pleocytosis was present in thirteen cases and there was a considerable reduction in all cases, with one exception. In twelve the protein test showed an excess of globulin, which was slight in one. Of these twelve cases, nine were rendered negative, and in three there was a slight excess. The one showing a slight excess was rendered negative.

Dr. J. Ramsay Hunt, after referring to the very encouraging results obtained in the cases reported by Dr. Stephenson, said that Ehrlich had recommended in the last number of the *Abhandlungen ueber Salvarsan* the combined use of salvarsan and mercury in obstinate cases. A course of treatment with salvarsan, then, after a brief intermission, a course of treatment with mercury, or the mercury might precede treatment with salvarsan.

In a recent paper, Wechselmann had attributed a certain number of deaths from salvarsan intoxication to the preliminary use of mercury; he claims that the mercury produces a mild form of nephritis or renal disturbance, so that when the salvarsan is given, the kidneys are incapable of eliminating the arsenic, and a second injection under such conditions may result in serious symptoms of intoxication. It is well to keep this possibility in mind, Dr. Hunt said, in connection with the intensive treatment, as outlined by the reader of the paper. We know that the kidneys are an important factor in elimination and during such a course of treatment as this the renal secretion should be frequently examined, preferably

daily, and at the slightest indication of disturbance, further medication should be postponed and every precaution should be taken to guard against untoward results.

Dr. Hunt said he had seen two cases of very severe intoxication from salvarsan, both following the second injection. In both instances, slightly less than the usual dose was employed, and the full interval of one week was allowed to elapse after the first injection. In one of the cases a severe myelitis developed, and in the other there was a general intoxication, with jaundice. Both were most severe, and, in the acute stage, alarming cases. While the results obtained in the series of cases reported by Dr. Stephenson were most encouraging, both from a serological and clinical standpoint, they should not blind us to the possible danger of pushing the medication in these patients.

Dr. Leszynsky said that in one of the cases reported by Dr. Stephenson, he spoke of giving one sixth of a grain of mercury, presumably the bichloride, following which the Wassermann in both the blood and cerebrospinal fluid became negative. It was an open question, Dr. Leszynsky said, whether the serological reactions were changed by the mercury or the salvarsan, and personally, he would be inclined to depend on the action of the former, which was safer than salvarsan. The speaker said that in a number of cases he had used potassium iodide in increasing doses coincident with injections of neosalvarsan, without untoward results.

Dr. Abrahamson said that at the Mt. Sinai Hospital, in the service of Dr. B. Sachs, they employed an intensive method of treating severe cases of cerebrospinal syphilis, but the treatment was carried over a longer period than that described in the paper. In cases with a doubtful and negative Wassermann, they give a provocative injection of salvarsan to bring out a positive reaction.

In connection with this general subject, the speaker said, the question naturally arose, what did a serological examination mean? Personally, he did not believe that the result of an examination of the cerebrospinal fluid indicated definitely the degree of the infection. Such a presumption was too often contradicted by the actual findings. On the one hand, they saw serious parietic and tabetic cases with mild serological findings, while on the other hand, patients with very slight symptoms often gave very positive blood and cerebrospinal findings. The important factors were the symptoms presented by the patient. They deserved more consideration than a negative or positive Wassermann in the blood or fluid; the effect of treatment on the biological findings was very important.

Dr. Abrahamson said their results with general paresis had not been as favorable as some of those reported by Dr. Stephenson, and they had not succeeded in rendering the fluid of many general paretics negative. These had proven the most obstinate of all their cases, much more so than the tabetics. He did not believe that the biological examination was definitely diagnostic between tabo-paresis and general paresis.

Dr. Goodhart, replying to Dr. Hunt, said he did not think it was the mercury that brought about the disturbance of the renal function, which in turn was responsible for the subsequent salvarsan intoxication. We knew that salvarsan was given to syphilitics by men in other lines than neurology with comparatively little regard to organic disturbance, such as heart lesions, etc. Personally, he was rather inclined to attribute the untoward results that had been reported to the combined treatment. When salvarsan and mercury were administered at the same time, it was quite possible that a poisonous compound was thus generated.

Dr. H. Goldenberg (by invitation) said that in his remarks he would limit himself to a discussion of the statement of Wechselmann, quoted by Dr. Hunt, that some of the fatal results which had been reported were due to the combination of salvarsan and mercury. Without any intention of trying to detract from the credit of Wechselmann for his work in this field, we should not lose sight of the fact that he had not been entirely consistent, and had changed his mind repeatedly on this point. At first, he attributed the fatalities to the so-called "*Wasserfehler*," and now he thought these were due to the mercury which had been combined with the salvarsan.

Dr. Goldenberg said that from the very beginning of the salvarsan era, he had made it a rule, at Mt. Sinai Hospital, to combine the salvarsan with mercury injections. He had had two deaths which were due not to the mercury or to the combination of the mercury and salvarsan, but purely to the salvarsan. The first was one of his very early cases; in fact, his first case of intravenous injection. The patient was an adult with mucous patches, who had contracted a chancre about a year before. He left the hospital five days after the injection, went on a debauch the same night, and was re-admitted two days later. He was then irrational, became maniacal and died a week later under the symptoms of a hemorrhagic encephalitis.

The second case was that of a girl of fifteen, with lesions on the vulva, due to an acquired infection. She had received one salvarsan injection without untoward symptoms. Two weeks later she received a second injection of 0.4, which was followed by a rise of temperature, a transitory erythematous rash, jaundice, multiple neuritis, with ulcerations in the mouth, at the base of the tongue and on the epiglottis. She died with the clinical picture of an acute yellow atrophy of the liver, seventeen days after the second injection.

The so-called Herxheimer reaction, following immediately, sometimes while the patient was still on the table, or subsequently, the symptoms consisting of flushing of the face, watery eyes, intense headache, swelling of the mucous membranes of the mouth, abdominal cramps, etc., had recently been explained by Milian, a French writer, as being due to a dilatation of the blood vessels caused by the arsenic. In a number of cases where he had previously observed this complex of symptoms he was able to prevent them after subsequent injections by the previous intramuscular administration of adrenalin.

Neurorecidives were not seen any more in his service, Dr. Goldenberg said, since the patients were given sufficient salvarsan treatment. They were due to syphilis, and not to salvarsan.

Dr. Hunt thought that Wechselmann's discovery of the "*Wasserfehler*" was a most valuable contribution to the technique of the administration of salvarsan. It was a step in the right direction toward the perfection of that technique, and the same could be said of his more recent work in attributing the possibility of salvarsan intoxication to the deleterious action on the kidneys of a preceding course of mercury. This, the speaker thought, could scarcely be regarded as a change of mind on Wechselmann's part. It is certainly of the first importance that every contributory factor in the production of unfavorable results, both in the technique of administration and the selection of cases, be carefully analyzed, and such factors, when determined, eliminated. It can hardly be questioned that ignorance of these factors in the early period of the salvarsan treat-

ment and inattention to them in the later is largely responsible for the fatalities and many of the untoward results which have occurred.

Dr. Goldenberg said he did not wish to be misunderstood in his remarks as criticizing Wechselsmann, who was a pioneer in this work. He only spoke of the apparent change in the views of that authority as to the cause of death following the administration of salvarsan. Personally, Dr. Goldenberg said, he had given salvarsan in a number of cases of supposed syphilitic nephritis, not only without injurious results, but with great benefit to the patient.

Dr. Smith Ely Jelliffe said he had been using this form of therapy in conjunction with intraspinal work ever since Dreyfuss had insisted on a more rigorous specific therapy in cerebrospinal syphilis. He had advocated it in his chapter on the Treatment of Cerebral Syphilis in White and Jelliffe's "Modern Treatment of Nervous and Mental Diseases." His chemo-biological results had been very satisfactory and the clinical results in paresis surprisingly promising.

THE NEURAL ATROPHY OF THE SMALL MUSCLES OF THE HAND, WITHOUT SENSORY DISTURBANCES

By J. Ramsay Hunt, M.D.

The author referred briefly to the two types of *neural atrophy of the small muscles of the hand, without sensory disturbances*, described by him in previous communications.

I. A *hypothenar type*, from compression neuritis of the deep palmar branch of the ulnar nerve.¹

II. A *thenar type*, from compression neuritis of the thenar branch of the median nerve.²

The author stated that one of the chief points of clinical interest of these two types of *neural atrophy of the small muscles of the hand, without sensory disturbances*, lay in their resemblance to and possible confusion with the atrophy of the hand muscles of spinal cord origin, viz., the Aran-Duchenne type of progressive muscular atrophy, the early stage of amyotrophic lateral sclerosis beginning in the hand musculature, and the various types of subacute and chronic poliomyelitis of syphilitic origin in which the lesions originated in, or were more or less restricted to the lower segments of the cervical cord. Of especial importance is the so-called *Tephromalacia anterior* described by Marie and Foix, in which an atrophy of the anterior horns, limited to the 8th cervical and adjacent portions of the 7th cervical and 1st dorsal segments of the cord, is produced by a vascular lesion of syphilitic origin. (Enderteritis and periarteritis without thrombosis.) The cord lesion runs an exquisitely chronic course, and the muscular atrophy is strictly limited to the small muscles of the hands.

I. The *hypothenar type* of neural atrophy without disturbance of sensibility is characterized by a complete paralysis, with consecutive atrophy and reactions of degeneration in all the muscles of the hand supplied by the ulnar nerve (the hypothenar, interossei, adductor pollicis and inner head of the flexor brevis pollicis). There are no objective nor subjective disturbances of sensation in the distribution of the ulnar nerve. The ulnar

¹ JOUR. OF NERV. AND MENT. DIS., 1909.

² Amer. Jour. Med. Sciences, February, 1911.

flexion of the wrist is preserved, as is also the function of the *palmaris brevis*. The motor branch to this small subcutaneous muscle passing in the superficial palmar, which is sensory; the deep palmar is purely motor in function. The preservation of this small motor branch to the *palmaris brevis* and of the sensory functions showing that the compression lesion is situated in the deep volar branch, after the division of the nerve at the level of the pisiform bone. Just after this division the deep palmar branch passes between the tendinous origins of the abductor minimi digiti and the flexor brevis minimi digiti to beneath the hook of the unciform bone; the compression neuritis, therefore, by a process of exclusion, must take place in this section of the deep palmar branch.

Report of a Case.—The patient is a man of 30; by occupation an ironer and presser of clothes. He denies lues and gives no history of alcohol or lead intoxication. For the past six months he has suffered from weakness of the right hand, with gradually increasing atrophy. In spite of this he has continued his occupation. He has had no pain and no paresthesia in the distribution of either the ulnar or median nerves.

There is complete paralysis, with considerable wasting, of all the hand muscles supplied by the ulnar nerve, with complete reactions of degeneration. The ulnar flexion of the wrist and the function of the *palmaris brevis* are preserved. Sensation is perfectly normal to touch, pain and temperature, and the deep sensibility is preserved. The atrophy and paralysis are strictly limited to the ulnar distribution in the hand, and the hand has somewhat the attitude and appearance of the *main en griffe*. No fibrillations are present. There was no tenderness on pressure along the ulnar nerve, but deep pressure at the pisiform bone was slightly tender.

The pupils are equal and react normally. All the tendon reflexes of both upper and lower extremities are normal in intensity, and are equal on the two sides. The skin reflexes are normal. The plantar reflex gave a flexion response on both sides. An X-ray examination for cervical ribs was entirely negative. There was no lead line on the gums, and the Wassermann reaction was negative. The urine was normal. Lumbar puncture was not permitted.

II. *The thenar type of neural atrophy without disturbance of sensibility* is characterized by paralysis and reactions of degeneration, with atrophy of all the small muscles of the thenar eminence, supplied by the median nerve. There are no subjective nor objective sensory disturbances in the distribution of this nerve. The compression lesion in this type takes place beneath the anterior annular ligament, where the thenar branch, a purely motor nerve, emerges, before dividing into the muscular branches to the abductor pollicis, the opponens pollicis and the outer head of the flexor brevis pollicis.

Report of a Case.—The patient is a man, 49 years old. He denies lues, has used alcohol in moderation and gives no history of lead intoxication. By occupation he is a general house worker, sweeping, scrubbing and washing floors and polishing brass. This patient, Dr. Hunt said, had been under his direct observation for a year, presenting himself originally for a weakness of the left thumb, with wasting of the muscles in the thenar region. This had appeared a few weeks previously without pains or paresthesia. During the entire period of observation he had had no subjective sensations in the distribution of the median nerve. The paralysis and atrophy were confined to the thenar muscles supplied by the median nerve. The function of the adductor pollicis and the inner portion of the flexor brevis pollicis were preserved.

There are complete reactions of degeneration in all the thenar muscles supplied by the median nerve; all the other small muscles of the hand were normal, both in power and electrical reactions. No fibrillations were noted in the atrophic area. There were no objective disturbances of sensation in the right upper extremity, and the median distribution was entirely normal to touch, pain and temperature. There was no tenderness along the course of the median nerve. The urine was normal. The X-ray showed no cervical rib. There was no lead line on the gums.

The pupils were unequal; right > left; both pupils were rigid to light, and the left only reacted to accommodation. The supinator, biceps and triceps jerks were equal on both sides, and not exaggerated. The jaw jerk was present. The knee jerks were unequal, the right being less active than the left. Both Achilles jerks were present and equal. Plantar reflex normal. For the past seven months the patient had complained of mild, lancinating pains in the legs and chest, with slight vesical trouble. No crises; no diplopia. A mammary zone of hypalgesia and analgesia was demonstrable. The Wassermann reaction was negative. Spinal puncture was not performed. Diagnosis, *incipient tabes* and the *thenar type of neural atrophy*.

The clinical diagnosis of *tabes incipiens* in this case is based upon the Argyll-Robertson pupil, lancinating pains, unequal knee jerks, vesical disturbance and a mammary zone of hypalgesia, a group of symptoms which makes such a diagnosis practically certain. The existence of parasymphylitis in conjunction with atrophy of the thenar eminence suggests, first of all, a myelopathic origin, developing upon the basis of an old syphilis. This interpretation, the speaker said, he would exclude in the case under consideration for the following reasons: The paralysis was of rather rapid onset, and was definitely limited to the muscles supplied by the thenar branch of the median nerve. The reactions of degeneration were complete five weeks after the onset of symptoms, and were at that and at the present time definitely limited to the median nerve distribution of the hand. After a year's observation, there had been no extension of weakness or atrophy to other muscle groups of the hand. At no time have fibrillations been noted. The process has remained definitely limited to the distribution of the thenar branch of the median nerve on the left side.

The author believed that such affections as progressive muscular atrophy, chronic and subacute poliomyelitis could be excluded by reason of the strict limitation to a neural distribution and the absence of progression and other symptoms indicating spinal cord involvement.

The *tephromalacia anterior*, as described by Marie and Foix, could also be excluded with equal certainty by reason of the comparatively acute onset of the symptoms and the strictly neural distribution. In Marie's two cases of *tephromalacia anterior* of syphilitic origin, with autopsy, the lesions were bilateral, affecting both hands, although predominating in one, and there was a diffuse atrophy of the small muscles of the hand, and not limited to a definite neural distribution, as in the two groups of cases described by Dr. Hunt. The similarity may be great, however, as Marie insists on the non-progressive tendency and the strict limitation to the small muscles of the hands. That the lesion of *tephromalacia* should be so limited is in itself interesting and peculiar, but that this limitation should assume a persistently neural character and distribution, as in the thenar and hypothenar types of neural atrophy of the small muscles of the hand is from the very nature of the lesion scarcely conceivable.

In a recent communication before the Société de Neurologie de Paris, November 13, 1913, Marie and Foix record a case of double thenar atrophy, with autopsy, in which the spinal cord was found normal, and a compression lesion of the median nerve was demonstrated beneath the annular ligament of the wrist, which is confirmatory of the localization and nature of the lesion which the speaker said he had assigned in his original communications on this subject.³

Dr. Abrahamson said that some years ago he showed two cases of bilateral symmetrical atrophy of the flexor brevis pollicis. The patients were presented at one of the meetings of this Society. He saw one of those patients recently, and there had been no change in the condition.

Dr. Goodhart said it was rather difficult to conceive how a lesion restricted to the 7th or 8th dorsal segment of the cord could produce such a selective action on certain muscles of the hand. Stewart and others recently reported cases where an atrophy and paralysis of certain muscles of the hand was traced to the presence of cervical rib. Goodhart reported similar cases. In one of his cases, given in detail in *Amer. Jour. Med. Sci.*, double false ribs were described in one patient. The initial symptoms were atrophy of the interossei, and the diagnosis of progressive muscular atrophy had been previously made. Removal of both ribs arrested the process.

Dr. Hunt, in closing, said that in his second case, the X-ray had shown no evidence of the presence of a cervical rib. Of course, there were many lesions along the entire course of the peripheral neurones of the upper extremities, which might produce these localized hand atrophies, and all such possible etiological factors should be borne in mind.

The statements made by Marie and Foix in regard to the arterial changes observed in their cases, were based on very thorough pathological studies. These vascular lesions were of specific origin, with a resulting atrophy and loss of substance of the anterior horns, with complete preservation of the white substance of the cord. That the tephromalacia should be so limited in a syphilitic vascular lesion is indeed strange, and the authors are unable to offer any explanation for this peculiar predilection for the lower cervical region and its limitation to one or two segments of the cord.

Therefore, in the interpretation of non-progressive atrophy of the small muscles of the hand, without sensory disturbances, two distinct conditions must be borne in mind, the tephromalacia anterior and the thenar and hypothenar types of neural atrophy.

³ Compression neuritis of the thenar branch of the median nerve. A well defined clinical type of atrophy of the hand. "Trans. Amer. Neur. Assoc.," 1909.

CHICAGO NEUROLOGICAL SOCIETY

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The President, DR. RALPH C. HAMILL, in the Chair

THE USE OF SALVARSAN WITH SPECIAL REFERENCE TO
COMPLICATIONS AND SEQUELÆ; ALSO THE RELATIVE
MERITS OF THE VARIOUS METHODS OF
ADMINISTRATION

By Frederick G. Harris, M.D. (by invitation)

The action of salvarsan and neosalvarsan is identical, the majority of syphilologists believe neosalvarsan to be at least as efficient as salvarsan.

The question of toxicity depends largely on the method of administration. It is generally conceded that salvarsan is the more toxic, although neosalvarsan is much more readily decomposed. Milan, Girault and Duhot have shown that the toxic dose of salvarsan is 15-30 times the therapeutic dose. Iversen and Schriber have given 6.0 gm. in one week. Dujardin has given thirty-eight injections to one patient. Leupold gave during 20 days 7-5 gm. per kilogram to mice. To rabbits he gave 66 intravenous injections during 139 days, in all 11.75 gm., the final doses being fifty times the normal dose per kilogram of weight.

There are three big factors in the question of toxicity. First the decomposition of the drug. Second, the factor of the elimination of the drug. Third, the question of the injection or formation of poisonous proteids either bacterial or autolytic.

The bulk of the arsenic is eliminated by the kidneys and gastro-intestinal tract, the amounts being about equal. The fact that the arsenic is deposited in the parenchymatous organs, especially the liver and kidneys, leads to a cumulative action. The drug does not remain in the blood very long; Lorenz could find none in the blood after three hours, Saynisch could find none after one hour, Stumpke and Siegfried only found it during the first twenty-four hours.

Stumpke and Siegfried and Morel, Mouriquand and Policard found much more arsenic in the liver than in the kidneys. Ullman found the most in the gastro-intestinal tract, next in the liver, and then the spleen. He also showed that syphilitic tissue has a selective action and contains more arsenic than the surrounding normal tissue.

The arsenic deposited in the various organs is re-absorbed. It is found in the urine from nine to twenty-four days after intravenous injection, although Heuser found it nine months after. Frankel-Heiden found it in the urine after seven months, and Merkuriew found it six months after an intramuscular injection.

Frankel-Heiden and Narassart found that after intramuscular injection there was never more than 1.5 mg. of arsenic in the twenty-four hour urine, while after intravenous injection there was as much as 5.65 mg. They found that there was from two to ten times as much excreted by the intestines as by the urine.

Since it has been shown that neosalvarsan is at least as efficient as salvarsan and the latter is much more toxic than the former, there would seem to be no reason for continuing the use of salvarsan.

Neosalvarsan has been administered in every conceivable form. The preferable method is the intravenous. Wechsellmann's subcutaneous method is painful and requires an especial technique. The intramuscular method is painful and as shown by Swift is always followed by more or less necrosis, the necrotic material several weeks afterward containing 5-10 per cent. of the injected arsenic.

The much vaunted advantage of the slower absorption in the intramuscular method, has been shown by Swift to be somewhat illusory, 75-80 per cent. of the aqueous solution being absorbed during the first week. The arsenic of these drugs is valuable only when it is in this peculiar chemical combination, and since this is so unstable, the depot in the muscle must of necessity undergo more or less decomposition. In fact, Ehrlich has shown that neosalvarsan, when used subcutaneously, becomes oxidized, forming the more toxic para-oxy-phenyl-arsenoxide. Probably the same or similar change occurs when it is given intramuscularly.

The method of choice for the administration of neosalvarsan is in the form of the concentrated solution, as recommended by Ravant. A normal dose or 0.6 gm. is dissolved in 8-10 c.c. of sterile distilled water in an all glass syringe and injected directly into the vein.

Of interest to the neurologist is the use of the drug in the subarachnoid space. Canns, Ellis and Swift, and others, have shown that salvarsan is unsuitable for this method of administration. The matter is different with neosalvarsan. In 1912 Wechsellmann injected 2 c.c. of a 1.5 to 1,000 solution equivalent to 3 mg. subarachnoidally in a paretic, producing no irritation. Eleven days later 7 c.c. of a similar solution caused no symptoms. The same author also gave 15 mg. to two congenital syphilitic children without causing any reaction. Castilli injected a number of rabbits with 1-2 c.c. of a 1 per cent. solution. Swift and Ellis injected minute quantities in a tabetic, causing severe lightning pains and retention of urine. Marinesco in eighteen patients gave 4 c.c. of a 1 to 800 solution. In the majority, the reaction was severe. In eight patients there was retention or incontinence of urine, three patients had weakness of the lower extremities, and one had anesthesia of the rectum, buttocks and legs. The method certainly deserves further study and would seem to promise much for the future.

Somewhat along the same line is Swift and Ellis's use of salvarsanized serum.

The complications and sequelæ are of two kinds, local and general; the former are all eliminated by a proper technic. The general complications are due to improper selection of the patient, too large or too frequent doses, and errors of technic.

In practically every case it is best to begin either with preliminary mercurial treatment, or small doses of neosalvarsan. Patients who are likely to stand the treatment badly are those with a syphilitic or non-syphilitic involvement of some vital organ, the former on account of the danger of a Jarisch-Herxheimer reaction, and the latter because of the possibility of softening or degeneration. Ehrlich has repeatedly warned against the use of the drug in patients with coincident infections, such as influenza, tonsillitis, enteritis, etc.

Schlossberg, Morel, Mouriquand and Policard, Schreiber and Hoffmann and many others have shown that the drug is not a renal irritant. Wechsellmann says that nephritis is no contraindication.

Experience and experimentation have shown that the drug is as harmless to the nervous system as to the kidneys. Morel and Mouriquand, Dominikow, Peythieu and others have shown the absence of toxic effect on the nervous system. The cases reported with degenerative changes can probably all be explained as due to the so-called water error, causing a decomposition of the drug, too large or too frequent doses or the use of a hypotonic solution.

Unless there is some contraindication a subsequent dose should not be given until the previous one has been eliminated. For normal doses this period is about two weeks.

The complications following the administration of salvarsan or neo-salvarsan are many. Anaphylactic symptoms and the Herxheimer reaction are usually of slight significance. Gastro-intestinal disturbances are almost entirely the result of the water error and do not occur after the use of the concentrated solution.

Febrile disturbances are of three types: 1st, specific, due to absorption of endo-toxines, or disintegrated syphilitic tissue; 2d, toxic fever, due to some of the factors of the water error; 3d, late fever seen in hemorrhagic encephalitis.

Renal complications are due to errors of technic, and are eliminated in the use of the concentrated solution. Hepatic symptoms are due to too large or too frequent dosage.

The nervous complications are usually the most distressing and are of two varieties, syphilitic and toxic. The syphilitic may be due to a Herxheimer reaction in the central nervous system, which comes on within thirty-six hours, due to too large dosage, or they may be due to a basilar meningitis occurring four to eight weeks later and causing paralysis of one or more of the cranial nerves, and is the result of insufficient treatment.

The most common toxic complication is a hemorrhagic encephalitis. It occurs about the third day, is accompanied by vomiting, temperature, epileptiform convulsions and coma, usually resulting fatally. It is probably always due to some error in technic.

Dr. William L. Baum felt that very little remained to be said, except to point out the relative merits of the intravenous and intramuscular methods of injection. While he was willing to admit that most of the complications are due to errors in technic, which probably will be overcome in a large measure by the method suggested and used by Dr. Harris, still the experience is not unlike that which prevailed during the earlier history of intravenous injections of bichloride. Those who remembered that experience of about twenty years ago realized what wonderful results were obtained from the intravenous injections of bichloride solutions. Unfortunately, the symptoms relapsed after this method of the administration of mercury, whereas where the injections were given intramuscularly, with the same quantities, a much longer time elapsed before the reappearance of symptoms. We know that the greater quantity of arsenic is eliminated in a very short space of time when intravenous injections are given, as it is with the intravenous injections of any remedial agent. While it is true that the arsenic disappears in a remarkably short period of time from the blood current, the amount deposited in the parenchymatous tissues of the body is exceedingly small. In other words, that portion which is supposed to be of value in the destruction of the spirochetes must be extremely small by this method of treatment. In his opinion, there is one phase of syphilis which has been ignored by prac-

tically all those who have worked on this subject, namely, the recognition of the fact that syphilis is a systemic disease, one which distributes itself throughout the human body by means of the lymphatic system and the glandular apparatus. We all recognize the fact that at the time of infection, wherever it takes place in the body, we are unable to draw diagnostic conclusions from an examination of the blood. We arrive at these only after the thorough distribution of the spirochetes and their toxins through all portions of the body; the blood stream is the last to be involved. Therefore, it is the Wassermann reaction which we get just preceding the appearance of the secondary symptoms which shows the toxic effect on the blood and the blood vessels themselves. Now, if this is true, why attack the disease from the opposite premises of intravenous injection? To the speaker it seems much more reasonable to expect good and more lasting results from the administration of salvarsan by intramuscular injection. It is true that this is a painful method, and may necessitate seclusion for a few days. Most men, in the early use of salvarsan, met with arsenic deposits in the tissues, resulting in necrosis, and causing a great deal more pain than is now experienced with the use of neosalvarsan. Now, the injections can be given in more concentrated form, and while they are painful, still he has not seen any cases of necrosis or permanent infiltration of the tissues lasting over any long period of time since neosalvarsan has been in use.

Granting that the therapeutic value of neosalvarsan and salvarsan is about the same, or, as Ehrlich claims, somewhat in favor of neosalvarsan, it seems to him that we are substituting a rational method of treatment, in which slow body resorption of the arsenic takes place, for a method in which rapid elimination of an arsenical compound reduces the therapeutic value to a minimum.

As concerns the Herxheimer reaction, Dr. Harris said it is probably due in most cases to the action of the arsenic on some hidden foci or active processes, or due to the presence of intercurrent maladies. It is much less likely to occur when intramuscular injections are given. The speaker thought that we had all long ago abandoned the theory that we can get enough of any remedial agent to sterilize the system and kill off all of the spirochetes at one time, and he was very glad to hear Dr. Harris speak of the repeated administrations of these remedial agents, carrying the treatment over a long period of time. He was entirely in accord with this attitude.

Dr. Baum is thoroughly convinced that the men, both in this country and abroad, have been overly enthusiastic as regards the use and effects of this method of treatment. Great as the discovery is—great as its value is in the elimination of symptoms—he still believes that the symptoms will be relieved or controlled for longer periods of time if the intramuscular injections are used. Those who were most enthusiastic about salvarsan are now using mercury and other methods of treatment as well, and the time is far too short to draw any definite or permanent conclusions. As far as its value in nerve lesions is concerned, he is satisfied that the results have not been as satisfactory by far as had been anticipated and hoped for.

Dr. P. F. Shaffner is of the opinion that there is something to be said for and against both the intravenous and intramuscular methods of administering salvarsan, and he takes the view that no one should adhere strictly to either one or the other procedure in treating all cases of syphilis. His only experience with the original salvarsan preparation was along the

line of its intravenous administration. The chief point in favor of the intramuscular route is the slow, long-continued absorption. As Dr. Harris had said, arsenic was found in the urine of patients for several days after an intravenous injection, and from several days to six months after an intramuscular injection. He believes, however, that the giving of two, three or more intravenous injections within a comparatively short space of time will probably result as beneficially as if given intramuscularly. As stated, the disadvantages of the intramuscular technic are pain and necrosis. The pain, as a rule, is slight when the Wolbarst technic is employed. Nevertheless, any refinement of technic which will enable us to gain the confidence and cooperation of the patient is of value, and a painless procedure—everything considered—is preferable to a painful one. He has never encountered severe pain after the Wolbarst administration; in fact, the reactions have been, as a rule, less severe than those following the intramuscular use of calomel, gray oil, salicylate, or bichloride. He has never seen any indurations or necroses that persisted.

Dr. Yudelson asked regarding the particulars of the Wolbarst method.

Dr. Shaffner replied that it consists of suspending the neosalvarsan in about one cubic centimeter of glycerine, and adding a few drops of a one per cent. aqueous solution of beta-eucain. This is injected, either the whole quantity in one buttock, or half in each.

Necroses have been demonstrated experimentally. Tomassi, in 1912, stated that the intramuscular methods produce necrotic changes in all tissues with which the preparation comes in contact, regardless of the amount or method of preparation. Connective tissue, blood vessels, muscles and nerves take part in the process. Leahy believes that with such conditions present, because of the granulation tissue formed, slow, long-continued absorption is impossible. The mere fact that reactions occur more often after intravenous medication than intramuscular would lead the speaker to be in favor of rather than against the method. When we give salvarsan, we are attempting the destruction of the spirochetes, and he believes that this destruction is the cause of the reactions, expressed in terms of fever, nausea and vomiting, chills, etc. He does not believe that the "water error" is entirely responsible for these reactions, for he has found that the earlier the case of syphilis, when more spirochetes can be reached by the drug, the greater the reaction, and the fact that the first of two, three or four injections given in a comparatively short period of time, using the same quality of freshly distilled water, produces a greater reaction than the subsequent ones inclines him to the view that the water error is not the only factor. Perhaps these reactions are due to the endotoxins of the destroyed spirochetes. Ehrlich suggested this possibility at the recent International Congress, and with that in mind urged a prior course of energetic mercurial treatment in the early cases of syphilis.

The occurrence of nephritis has also been extensively noted in the literature. It has been observed that intravenous injections of salvarsan produced a trace of albumin, and a few hyaline casts, which lasted but a few days, and then entirely disappeared.

He had seen but one neuro recurrence, in the form of an optic neuritis, which cleared up entirely under additional salvarsan and mercury.

Dr. Shaffner favors the giving of large doses of the iodides prior to a salvarsan medication, especially in the late stages, when the spirochetes are encapsulated and surrounded by connective tissue. He does not believe that potassium iodide is a parasiticide, but thinks it may act as a

solvent about the spirochetes, rendering them more accessible to the drug, and in this accomplishing some good.

Dr. Archibald Church did not feel that he was going to speak in definite response to the paper of Dr. Harris, but when this question came up, in order to satisfy himself as well as he could, he made a résumé of the cases that he has had under personal observation since the beginning of salvarsan administration in Chicago, and for purposes of discussion had taken up the first eighty cases, which he treated personally, all dating back of the year 1912. These cases were made up almost without material exception of the late stages of nervous syphilis. In those days, only three years or less ago, we did not think that we were fighting the spirochetes when we were treating cases of the parasyphilitic type. Most of these cases were cases of tabes, of general paresis, of combinations and of cerebrospinal syphilis. Only two were cases of active syphilitic processes in the brain, such as might be supposed to be of gummatous character. The great majority of the cases he was able to trace down to the present time, but after all the number is so small that it did not justify any very definite conclusions.

The cases of general paresis have, if he might use his own experience and judgment in the matter, shown a tendency to be prolonged. In one or two cases the condition of general paresis has apparently been so completely controlled that a partial recovery has ensued, which seems to be stationary—he cannot say permanent—that will be determined by the future.

Of the cases of locomotor ataxia which have been treated, the impression is that the condition has been in some degree controlled by the use of salvarsan. He recalled one instance in which the knee jerks were reestablished; then disappeared; and under subsequent injections were again reestablished; disappeared again, and were a third time reestablished. The Argyll-Robertson pupil also disappeared, but an inequality persists. A beginning optic atrophy in that case seems to have come to a standstill, and the fields have considerably enlarged and show a tendency to remain so.

In view of the recent discovery of the spirochetes in the cortex in cases of general paresis, we have all the more ground for treating them as if they were distinctly syphilitic in every respect.

In regard to the administration of salvarsan in these eighty cases, it was the old form in every instance, and in the early cases the suspensions and alkaline solutions were used with some terrific local reactions. After about thirty cases the method was changed to suspensions in oil, which gave no very great local disturbance in any instance under his observation.

Dr. Church said that as far as the administration of neosalvarsan is concerned, he is distinctly in favor of the intramuscular method, and the technic he uses is practically the same as that described by Dr. Harris for intravenous use, only he uses it intramuscularly. Since following this technic he does not see elevation of temperature, nausea or headache. About once in twenty times the patient has an efflorescence on the skin. But aside from the very trifling general physical condition, and from a decidedly trifling local disturbance of pain and swelling, the intramuscular method seems to answer very nicely. So far as controlling the condition is concerned, he has made Wassermanns of the blood and in many cases of the cerebrospinal fluid, and he is convinced that the intramuscular method which he uses is adequate. We are still feeling about in this field

of salvarsan treatment. At the present time the cases he sees are all subjected also to mercury. Many of the eighty cases referred to received mercury in conjunction with the salvarsan treatment, which agrees with the general statement made this evening that neither remedy can be depended upon alone, but by a judicious combination we have the best prospect of controlling the disease.

So far as the iodides are concerned, he was glad to have heard the expression of Dr. Shaffner, because it accords with his own opinion that iodide has no place in the late degenerative clinical varieties of syphilis.

THE IMMEDIATE RESULTS AND ULTIMATE PROGNOSIS FOLLOWING THE ADMINISTRATION OF SALVARSAN

By Thor Rothstein, M.D.

The speaker discussed the pathology of these different conditions, especially that of tabes and general paresis, in which administration of salvarsan might be questioned. He divided the cases into two groups—pathological and anatomical, and again divided these into cases of syphilis of the cerebrospinal system, cases in which we have both degeneration in the posterior cord and at the same time luetic affections of the central nervous system; in another group tabes, and divided those cases into progressive and more stationary; in another parietic dementia. Of course, the pathology of lues of the central nervous system is a well-known fact, but about tabes there is still dispute. When cases of tabes are posted, there are found around the posterior roots infiltrations, of a syphilitic character, in a certain sense an extension of a syphilitic meningitis. He has not had occasion to examine any cases of syphilis of the spinal cord, because they occur very seldom. Referring to cases of tabes that are not very rapidly progressive, lasting for long periods of time, post-mortem examination will show changes which are mostly degenerative, but if examined very carefully you will find that the degenerations are radicular; that they depend upon an affection of the roots. The degeneration seems to follow the embryonal systems in the posterior column. He has examined many such cords, at least fifty, and in every case has been able to find some infiltrations around the posterior roots. Certain authorities believe that tabes is nothing else than a syphilitic meningitis. Spielman, in his studies of the treponema, quite clearly showed that by injecting either dead or living treponema into the body he could cause in animals a degeneration in the posterior cords, which was absolutely free from any kind of cellular infiltration. Strumpell has explained most clearly that it is not directly syphilitic, but a toxic affair, caused in some indistinct way by the syphilitic virus.

Moreover, when we get a case, can we decide whether it is a mixture of syphilis and tabes, or is it a simple progressive tabes or a stationary tabes? He thinks that that is not possible. There are, of course, all kinds and degrees between progressive and stationary tabes, but we cannot take it for granted that we are able to put one man in the stationary class and another in the progressive class. But examination of the spinal fluid will help in the diagnosis—it elicits some points, but gives no absolute information.

Another thing: Many have attempted to draw inferences from the spinal fluid as to the differences between paresis, lues and tabes. It is very true that when you take a given group of true paresis patients and a

given group of tabes patients, there will be a great difference. Nonne, for instance, says that he gets a positive Wassermann in the spinal fluid in all cases of tabes. That is, however, the only reference of the kind that he has noted. As a general rule, it will be shown that the spinal fluid is negative or at least much weaker than in dementia paralytica. In dementia paralytica you get Wassermann plus in both blood and spinal fluid, a Nonne test and a lymphocytosis, but you can get just exactly the same picture in some cases of tabes. So the spinal fluid has not given us any absolute help in the diagnosis between these different conditions.

After Noguchi has found the spirochetes, both in tabes and dementia paralytica, of course we cannot consider paralytic dementia and tabes other than dependent upon the presence of the spirochetes in the central nervous system, but, as Ehrlich puts it, we may consider it as a late finding.

From all that has come to our knowledge and from the work that has gone on, we have to draw the conclusion that whenever we have a person before us who suffers from symptoms of tabes, then it is correct to submit him to an anti-luetic treatment.

Regarding cerebrospinal syphilis, one can say that the general impression is that the treatment with salvarsan does not do so very much more than mercury. Certain affections, such as gummatous meningitis, heal very nicely with salvarsan, but so they do with mercury. There are, however, certain cases which have not been benefited by the remedy, but if we had treated the patients first with salvarsan and then with mercury perhaps we would have the same thing. There are a few such cases in the literature. Some men are not very well satisfied with salvarsan, and their statistics are not so very good. For instance, Oppenheim. Out of twenty-two cases of spinal lues, eight improved, fourteen did not improve. But, Nonne, out of twenty-eight cases, had eight cured, eleven improved, and 8 not improved. Of simple spinal lues he has three not improved,—that is of six cases; one other was cured and two improved. But we must take into consideration that the treated cases were of long standing, old spastic paralyses, and had been treated for a long time with mercury, first, then left alone, and the spastic paralysis lasted for several years. Then there is not so very much hope for any influence.

Donnet, who has given one of the latest statistics, relates many excellent results by using salvarsan in cases where the mercury has not done so very well.

The speaker related two cases, especially, from his own experience, both with a certain degree of aphasia. One was given three injections, the other four, of salvarsan. They had not improved for four or five months, although mercury had been kept up, and then the salvarsan was given, with the result in one of the cases that the man has worked ever since. The other patient is very much improved, so that she can walk around. Neither of these cases is actually well, but the improvement came very quickly after the salvarsan injections—even after the first one.

The speaker then gave the statistics of Schwarz, Foerster, Kaplan, Collins, and others, and concluded by saying that he thinks in salvarsan we have, perhaps, a great remedy for the prevention of tabes and paralytic dementia, if we take into consideration what salvarsan really has done in stopping the spread of syphilis in the body, and when we take into consideration, as Dreyfus has shown, that the spinal fluid is already changed in the secondary stage. So, if all syphilitic patients are kept under the physician's care until the spinal fluid is completely negative, we may hope for benefit from the use of salvarsan.

Dr. Sydney Kuh thinks that when the neurologist attempts to treat a case of syphilis of the central nervous system, he faces a task which is entirely different from that of the dermatologist who treats a syphilide, or the majority of those lesions with which that specialty deals. The difference lies in this, that to the dermatologist come those cases very largely in which no destruction has appeared in really vitally important tissues, while when the case comes to the neurologist such tissues, in the vast majority of cases, have been destroyed. If we will bear this distinction in mind, Dr. Kuh thinks that the results which have been obtained with salvarsan in diseases of the central nervous system have been all that one could reasonably expect. Nobody who has the faintest conception of the pathology of tabes or of general paresis would expect, reports to the contrary notwithstanding, that such a thing as a cure is possible by any remedy. We know that when the nerve fibers within the spinal cord are destroyed, whether by syphilis or trauma, or any poison, those fibers are definitely destroyed, and that there is no such thing as restoring their function. So far as the results that we may reasonably hope to obtain are concerned, we cannot expect to cure general paresis. We do see, as mentioned by Dr. Church, cases with very marked remissions. One of the speaker's early salvarsan cases was a general paretic—not in the early stages of the disease, by any means—who had three injections and who, after the three injections, showed a very marked improvement, which lasted for a period of one or one and a half years. After that the disease progressed. It is, of course, difficult to say whether this improvement was the result of the salvarsan, since remissions of that type are seen independent of or under any sort of treatment. However, while a single case would not prove very much, he could not help feeling that, from the cases he has seen, the impression was forced upon him that these improvements occurred, as a rule, very rapidly after the injections had been given, so that there seemed to be some connection between the two. As he said before, however, an ultimate cure is, of course, absolutely impossible.

So far as tabes is concerned, exactly the same can be said as to ultimate cure. There is no doubt at all that we frequently see very remarkable improvement, and here, again, the fact is striking that occasionally, at least, an improvement will follow the injection almost immediately. Another one of his earlier cases was that of a man who had very few symptoms of tabes subjectively—nothing at all except terrific lancinating pains, which for months had made it impossible for him to work. The injection was given and followed within twenty-two hours by a very violent reaction, consisting of severe pain in the lower extremities, which, however, the patient himself described as different from those he ordinarily had, and that was the end of his pain—the lancinating pains had disappeared. Other symptoms will occasionally disappear with the same startling rapidity.

If the speaker might judge from his own experience, the effect of salvarsan injections is perhaps greatest upon the girdle sensations and girdle pains of the tabetic, which he is inclined to believe are due in the vast majority of cases to an accompanying syphilitic meningitis.

In discussing the subject of tabes and salvarsan, and particularly considering some of the statements made by the previous speakers, he felt compelled to emphasize the fact that he cannot agree with those who seem to think that the use of salvarsan is a very safe one in cases in which there is disturbance of the optic nerve. From the literature and from his own

experience he feels inclined to warn against the frequent use of the drug in cases in which the auditory nerve is involved as well. It is true that we give salvarsan injections to tabetics with optic atrophy apparently with perfect impunity, but how about those cases several years later? It has been not only his personal experience, but he believes also the experience of other observers on the other side as well, that those cases, if seen after a sufficiently long time, show a very decided deterioration, so far as the optic nerve is concerned. Here we face rather a peculiar situation. It has been claimed by a man of vast experience—Fehr—that salvarsan given during the earlier stages of syphilis has produced a decided decrease in the frequency with which ocular complications occur. On the other hand, when those ocular complications already exist, he feels that great care is indicated in the use of the drug. Perhaps the most disappointing experience Dr. Kuh has ever had in the use of salvarsan has been in the treatment of the paralysis syphilitica of Erb, which was described some twenty years ago, a disease the pathology of which is still disputed. These cases, the speaker had thought, would offer a splendid opportunity for marked beneficial results, but he was very sadly disappointed.

Dr. Rothstein very wisely dodged the second part of his task, which calls for a discussion of the ultimate prognosis—very wisely, because there is nobody here or elsewhere who at the present time can express an opinion as to the ultimate outcome. An accident brought it about that within the last few days Dr. Kuh had occasion to reexamine one of the very first men who was injected with salvarsan in the city of Chicago—a man who came to Michael Reese Hospital at the time when Dr. Jobling had a few flasks of that valuable drug sent to him from the Rockefeller Institute. This man is a physician. He was injected about three years ago. He disappeared shortly after the injection, but turned up again last week. Present examination shows no return of the syphilis, nor of the cerebral symptoms. The ultimate prognosis, however, Dr. Kuh would not care to give.

Dr. Peter Bassoe said that, on the whole, he has not seen very much better results with salvarsan than with mercury. He has seen some excellent ones, but also a few discouraging ones. In the latter class comes a rather remarkable case that he saw a little over a year ago. A man, over sixty years old, giving a history of chancre in youth and of undoubtedly syphilitic skin lesions within the last few years, suddenly developed a left-sided facial paralysis, and went to a dermatologist. A Wassermann test was made, which was positive. The patient was given salvarsan four days after the appearance of the left-sided facial paralysis. Two weeks after that he experienced extremely severe pains all over the body, with numbness and weakness in the extremities. The pains were so severe that he was given morphine. Then, after another week, right-sided facial paralysis appeared, and he then fell into the speaker's hands. He found that there was a loss of all tendon reflexes; marked mental disturbance of the type of Korsakoff's psychosis,—in short, he presented the picture of an extremely severe multiple neuritis, with bilateral facial paralysis. After some time a spinal puncture showed no increase in cells, but a positive globulin test. This fluid showed a negative Wassermann test, but the blood at the same time gave a positive result. He died six weeks later, but unfortunately no autopsy was permitted. It was a rather remarkable case. Either it was a syphilitic patient who was beginning to develop a rather rare affection, syphilitic multiple neuritis, which began in one

facial nerve and then attacked the other, and would have had all this anyway, or else he was a syphilitic patient with an ordinary facial paralysis. If so, perhaps if he had not been given the salvarsan he would not have had all the other things. Maybe he had a slight lesion of the pons beforehand, and the salvarsan produced a Herxheimer reaction, and that what the speaker was dealing with was a pons lesion. The fact that there was a positive globulin reaction might indicate that there had been a chronic syphilitic meningeal infection beforehand.

He has tried this remedy in a number of cases of general paresis and tabes without any striking result until he had the following case: A man of fifty-four years, with symptoms of tabes—severe lancinating pains, gastric crises, and so on, for years. When first seen he was in what appeared to be an absolutely demented condition. He had been ill, depressed and irritable for some time; then had very severe gastric crises and lancinating pains. He had received a good many drugs, and maybe that had something to do with the extreme mental dullness at the time. He also had a fresh herpes zoster. There was no pupillary light reaction. All tendon reflexes were gone. He was taken to the hospital immediately, where it was found that all "four reactions" were extremely strongly positive; there were ninety cells to the cm.; globulin test extremely strong, such as is given in general paresis. The next day he was given an intravenous dose of neosalvarsan. Inside of a couple of days he was perfectly clear mentally; the pain disappeared. He went home in a week's time, and in another week went back to work, and has now been back at work for several months and has not had any subjective symptoms. The tendon reflexes are still absent. One of his pupils now reacts to light; the other does not. The speaker might have been mistaken in his test the first time. He does not know whether the man really has general paresis, but he certainly appeared very much like it the first time, but at any rate he has tabes and for the time being he is symptomatically well. He might have done as well with mercury. Now, three months after the first examination, the Wassermann and globulin tests remain positive, but there are only fourteen cells per cubic mm.

Speaking of the Herxheimer reaction, he related another case. A woman came to the Presbyterian Hospital complaining of terrible headaches. She had a very severe iritis in the right eye, so that it was impossible to see the fundus. In the other eye she had a distinct optic neuritis. She gave a history that she had just been at another hospital, on account of the headaches, and other symptoms of syphilitic meningitis, and had received a dose of salvarsan, after which the iritis began. The Wassermann test was still positive and the various tests with the spinal fluid were positive. She was treated with mercury for a little while and the iritis remained very severe. Then another dose of salvarsan was given. It was interesting that immediately after the injection she had a distinct aggravation of the iritis, followed by a very rapid improvement. Inside of a couple of weeks the iritis cleared up and the headaches gradually disappeared. The optic neuritis also receded.

The Herxheimer reaction is evidently playing a great rôle in these cases.

One of the best studied cases reported is that of Westphal. This patient had not had any symptoms on the part of the upper portion of the spinal cord, but after a salvarsan injection, paralysis of both phrenic nerves supervened. Autopsy showed a chronic syphilitic meningitis affect-

ing the third cervical segment, from which the phrenic nerve springs, and evidence of an acute inflammation in that old lesion.

Dr. D'Orsay Hecht said that because of the special interest which attached to the intraspinal method, an interest much enhanced by Noguchi's discovery of the spirochete in the brain parenchyma, he had availed himself of a few opportunities in his hospital to try it out. While this was not a clinical meeting, he thought it might be relevant to show one of the patients treated by this method. The case was one of fairly well-advanced paresis. The technique employed was that of Swift and Ellis. There were no undesirable effects, except for diffuse aching body pains lasting for forty-eight hours. As a result of two intravenous and one intraspinal treatment a 4+ positive Wassermann and 50 cells per centimeter was reduced to a 1+ and 30 cells.

It is interesting to add that a Wassermann done on the salvarsanized serum, that part which remained over as a remnant of what was injected, was negative, showing that even the small amount of salvarsan incorporated in the blood serum produced a negative Wassermann.

Dr. Hecht doubts that the method therapeutically has anything to commend it at the present time. After all, one cannot tell how or by what route this salvarsanized serum, or any serum or remedial agent, thrown into the spinal canal reaches the brain substance, where the spirochete is supposed to be embedded.

Dr. D. Lieberthal said the proper note was struck by Dr. Kuh when he remarked that the freshly infected syphilitic came to the dermatologist, when graver lesions of the central nervous system were not present as yet, and that the neurologist saw the patient only after such had developed. Just in order to prevent these late manifestations, the method of choice with the dermatologists up to the salvarsan era had been to treat the syphilitic very vigorously with mercury, either by injection or inunction, with intervals, over a considerable period of time. And in most instances tabes and paresis were prevented. Since the introduction of the salvarsan preparations the tendency developed to throw everything that had proven reliable and effective overboard, and the new remedy was being injected *ad nauseam*. What proof was there that this new treatment will prevent late syphilis? Suppose the Wassermann were repeatedly negative for say a year or two? Would this mean that the patient was cured forever? The speaker had no criticism to offer to salvarsan and neosalvarsan as excellent remedies in syphilis, using them himself upon special indications, but only objected to them being used to the exclusion of the old remedies.

Which method of administration was preferable? The intravenous was quick in action and painless, yet not without danger. In an article in the *Cutaneous Review* of St. Louis of the current year, Wechselmann mentions that there have been recorded about one hundred and sixty-five deaths in a series of one hundred thousand intravenous injections. How many more did occur and were not recorded? No death was observed after hypodermic or intramuscular application. The speaker gives preference to the method which insures greater safety to the patient.

In conclusion, the speaker mentioned a new method of applying neosalvarsan hypodermically, which Wechselmann found to be nearly painless and as effective as the intravenous (*Cutaneous Review*). Wechselmann thinks the pain in former applications was due to the quantity of the vehicle. He, therefore, dissolves the dose in not more than one to two

cc. of distilled water, and applies it hypodermically over the trochanter major or between the scapulæ. In one thousand cases only a few suffered pain.

Dr. Harris, in closing the discussion, first referred to the relative merits of the intramuscular and intravenous methods of administration. To be sure, syphilis is a lymphatic disease, part of the time, at least. The organisms leave the point of infection and travel through the lymphatics until they reach the receptaculum chyli, then travel up the lymph channel along the spinal column and empty into the left subclavian; the infection now becomes hematogenous, in other words, a spirochetal septicemia and the organisms are distributed throughout the body.

Dr. Baum's argument for the intramuscular method will not stand close analysis. We will admit, for the purpose of argument, that salvarsan is absorbed through the lymphatics, but it is distributed through the blood as the spirochetes are, so that is no argument for the intramuscular method. Another argument advanced in favor of the intramuscular method is slow absorption. That was true with salvarsan. Swift has shown by experiments with rabbits, injected intramuscularly with neosalvarsan, and then dissecting out the site of injection, that seventy-five to eighty-five per cent. of neosalvarsan was absorbed within the first week, so that the slow absorption is one of a week. The rest of the arsenic remains there in what form? It is very questionable whether it remains as salvarsan, and that is the form of arsenic that is not dangerous. There were 913 forms of arsenic before neosalvarsan was discovered, each a little different, so it is not a matter of indifference in what form the arsenic is. It has to be absorbed in some way, so that the slow absorption is a detriment rather than an advantage. Then, again, it is not a matter of indifference what the arsenical concentration of the blood in our salvarsan cases is, any more than it is a matter of indifference how strong a solution of bichloride is when used as a disinfectant. If we have one tenth milligram circulating in the blood, we must not expect the same action as we would have if we had ten milligrams. That is one advantage of the intravenous method; we have the blood more or less saturated with an active chemical that we know acts as a spirochetecide.

Another disadvantage of the intramuscular injection is the fact that it practically nearly always necessitates putting the patient in the hospital. If salvarsan is of any value in the treatment of syphilis, it should be given as often as is necessary. That might mean twenty doses, or sixty doses. Every time we inject it in that way we produce a certain amount of necrosis. We can give a small series of intramuscular injections, but the pain and inflammatory reaction precludes an adequate therapy by this method.

About the reaction, which Dr. Shaffner spoke of, the reactions following salvarsan are of two kinds especially. The specific reaction is due to the reaction of the syphilitic tissues to the salvarsan, and it is still a matter of controversy as to what this reaction is due. It occurs in the first twelve to thirty-six hours. Some authorities hold that it is due to the liberation of endo-toxines of the spirochete. Limer and others, in investigating microscopically syphilitic lesions of the skin following salvarsan, found that there was very rapid disintegration of the syphilitic tissue. Ullman has shown that syphilitic tissue has a selective action for salvarsan, and that temperature following the injection of salvarsan is due to an absorption of this disintegrated syphilitic tissue, as well as of the spiro-

chete. One argument for this view is that we get these temperatures in cases of gumma, and we know microscopically that the gumma contains very few spirochetes, we get a temperature out of all proportion to the spirochetal content of the patient.

The other form of reaction is where we get gastro-intestinal symptoms that come on within three to twelve hours after the injection, even a bloody diarrhea, with vomiting and nausea. That is undoubtedly due to an arsenical irritation of the gastro-intestinal tract, and does not occur where the water error is eliminated. The water error looks like making a mountain out of a mole hill, until one carefully considers the process, and the ease with which neosalvarsan is decomposed. This decomposition is one cause of these reactions.

About Dr. Kuh's point, that syphilis of the nervous system differs from syphilis of dermatology, syphilis is syphilis, wherever it occurs. The treatment of syphilis is the treatment of syphilis wherever it occurs. Our remedies do not go very well from the vascular system into the nervous system. In cases of death following salvarsan injection, where the brain has been taken out, arsenic has never been found, when the blood was removed, but where the blood was left in the brain, they found arsenic. If salvarsan would go from the vascular to the nervous system, it would be a simple matter to treat syphilis of the nervous system.

There is no question but that Ehrlich will originate a substance for the treatment of nervous syphilis. All that is necessary is to find something that is spirocheticidal, and will pass from the vascular into the nervous system. We have such an example in urotropin, which is one of the few things that will pass from the vascular into the nervous system; it is, however, not spirocheticidal. The large size of the molecule in salvarsan keeps it from going from the vascular into the nervous system. On the other hand, it has been demonstrated that arsenic is found in the spinal fluid after the administration of salvarsan. Therefore a certain amount of salvarsan in the vascular system does go into the nervous tissues, and it is that small particle of salvarsan that has the curative effect in nervous syphilis. Why should we deny our patients the benefit of that small amount of arsenic? There is no question in my mind but what a large part of the good results reported by Swift and Ellis are due, not to the intraspinal injections, but to the fact that their patients had a very intensive salvarsan treatment.

There have been many cases reported, such as Dr. Bassoe described, with Westphal's symptoms, with softening in the cervical region, of the medulla, and of the spinal cord, and it is one of the things we must look out for. The way to prevent it is to give a preliminary mercury treatment, and then additional small doses of salvarsan.

In regard to Dr. Lieberthal's point, that the earlier treatment of syphilis was sufficient, he believed the earlier treatment of syphilis was very insufficient. The large number of cases of tabes and paresis and late manifestations that we see to-day is proof of that. There is no question that dermatologists to-day are treating syphilis very much more energetically than ever before. They have not overthrown all that was known about the treatment of syphilis, and simply give salvarsan, as Dr. Lieberthal said, *ad nauseam*, but salvarsan is simply another aid in the more rational treatment of syphilis.

Dr. W. L. Baum said, regarding Dr. Harris's statement about the lymphatic distribution of the spirochetes, that, after all, it is very easy to

make a statement of this kind, but it is not so susceptible of proof, for the reason that you do have lymphatic involvement taking place in all portions of the body, before the general blood current is involved. He knew that many authorities claimed to the contrary, but it has not been sufficiently proven.

Regarding the absorption of arsenic, and what becomes of it, all of those who are in favor of intravenous injection of salvarsan admit that after a few hours it does not occur as salvarsan in the blood, and that is why it is deposited in the parenchymatous organism as an arsenical composition, the exact composition of which no one has been able to demonstrate. The fact that necrosis takes place is because all tissues where any irritant substance is injected—and it undoubtedly undergoes chemical changes—undergo necrotic change. It does that if you inject gray oil or bichloride. No chemist has been able to demonstrate just what changes take place. The large number of intramuscular injections are of themselves active demonstrations of the fact that it is not a dangerous method of administration, and if properly given, under the same rules of technic which have been given for the intravenous injection, he thinks it is, in the long run, much preferable in the large majority of cases. So far as accumulation in the system is concerned, there is no more danger of cumulative effect of the arsenic when given in this way than when taken for a long time by patients in the form of Fowler's solution. Arsenic eaters are good examples. They can eat large quantities of the drug, after a time. And so he did not think the point was well taken.

Translations

VAGOTONIA

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER AND DR. LEO HESS
OF VIENNA

TRANSLATED BY WALTER MAX KRAUSE, A.B., M.D.,

AND

SMITH ELY JELLIFFE, M.D.

(Continued from p. 260)

We have designated this type of individual "*Vagotonics*." Under the conception of vagotonia we include all those constitutional conditions in which, in addition to the manifestations of a functionally increased vagus tonus and increased irritability in this anatomical system, there also exists a condition of increased sensitiveness to pilocarpin. In the light of the previously described antagonism between the two parts of the vegetative nervous system, we may add as a further earmark of the vagotonic disposition a relative decrease of reactivity to sympathetic stimuli.

Before proceeding further, two subjects must be considered which may baffle the recognition of or lead to errors in the diagnosis of the symptoms of vagotonia. These concern the vasomotor system and the automatism which exists to a certain degree in every organ.

Physiologically the significance of this automatism becomes clear when we see that all visceral organs have a definite automatism, even if all nerve impulses are excluded. It is difficult to decide whether the ganglionic impulses connected with these organs are the cause of this automatism, or whether the source of the activity lies within the muscle elements themselves.

The fact that of the various drugs, which have selective action

upon the vegetative nerves, some have a paralyzing, some a stimulating action upon the isolated organs speaks in favor of the nervous theory.

The vasomotor system may be considered as occupying a special position since its main function is to react to the momentary demands for the balance of the blood supply of the entire body. Both the nutrition and the functional activity of certain organs require a plentiful blood supply which causes a reversed condition in other organs which are at rest at that time. Of course these changes depend in the end upon a normal play of vasodilators and of vasoconstrictors. Since these depend upon visceral nerve influences, the vasomotor distribution of blood depends upon a greater or smaller irritability of these nerves.

We believe that in cases in which the vascular reaction is reversed the stimuli which come from visceral nerves should be considered as playing the principle rôle. Later, we shall consider the fact that the distribution of the blood supply, either too much or too little, may disturb the function of normal visceral stimuli.

4. *Physiological Observations.*—The question now arises: In which organs are we able to estimate the condition of tonus of the autonomic system, and what symptoms are significant of an increase of the tonus or of an increased irritability of this system, in the sense of the term "vagotonia"? It will be necessary at this point to comment briefly upon the anatomic and physiologic relationships which exist between the extended vagus and the internal organs.

For clinical purposes it suffices to recall the following physiological facts. The autonomic system gives rise to that part of the oculomotor nerve which supplies the ciliary body, the pupil and in all probability the levator palpebrum. Stimulation of the autonomic nerves therefore causes contraction of the pupil, spasm of the ciliary body (accommodation spasm) and widening of the palpebral fissure, the last being due to increased tonus of the levator muscle. Another branch of the autonomic nervous system lies in the chorda tympani. This innervates the salivary glands. Another nerve which is functionally but not anatomically related to the chorda tympani is that of the lachrymal glands. Stimulation of these fibers, as by pilocarpin, will cause increase in the salivary as well as in the lachrymal secretions. At the same time

the skin of the face and head becomes red, due to vasodilation, so that it may be assumed that (most probably) the vasodilators of the skin vessels of the head, including the mucous membrane, can also be stimulated by the autonomic nervous system. To what extent the erector muscles of the hair are governed by autonomic stimuli cannot be stated. All that is known is that sympathetic stimuli, as for example adrenalin, will produce "gooseflesh." In man it is most probable that the secretion of sweat is dominated by the autonomic (vagus) system, though up to the present time no anatomical or histological proof of this exists even in animals.

The vagus itself, in its narrower sense, innervates the heart, lungs and intestinal canal. It is as is well known the inhibitory nerve of the heart. The inhibitory influences act upon the rate of the beat of the heart (slowing of the pulse, or negative chronotropy), upon the reactivity to stimuli upon the strength of the contractions (diminishing the cardiac strength, negative inotropy diminishing the threshold for stimuli which may reach the heart (negative bathmotropy). Furthermore, vagal stimuli may diminish the transmitting power of the nodal system between auricle and ventricle (heart block or negative dromotropy). Finally, it is supposed that vagus stimuli diminish the tone of the heart muscle and thus increase the diastolic excursions (vagal action upon the diastole—Luciani).

From the clinical point of view there are only two actions of the cardiac branches of the vagus which merit consideration. These are: (1) Diminution of the rate of the heart beat; (2) diminution of the transmitting power of the nodal system.

The influence of the vagus upon the heart is lasting, but not always of uniform strength. This is best shown by considering respiratory changes. During inspiration the tone of the vagus is diminished; during expiration it returns to normal. The result is a respiratory arrhythmia which consists essentially in an inspiratory acceleration and an expiratory slowing of the heart beat (H. E. Hering).

Arterial pressure is only secondarily under the influence of vagal impulses. Peripheral vasodilation as well as slowing and weakening of the heart beat may cause a fall in blood pressure. But it must not be overlooked that vagotropic substances have a vasodilator action upon excised peripheral vessels in contrast to

the dilating action of adrenalin (Langendorf) upon the coronary vessels.

As to the influence of the vagus upon the bronchial branches, we know that stimulation will cause contraction of its smooth musculature. Since the fibers which supply the musculature of the larynx (*n. recurrens*) also run with the vagus, we may say that this nerve also dominates the "rima glottidis." It may thus be considered in the clinical observations which follow. As regards the function of respiration, the respiratory center as well as the autonomic nervous system take a share, so that, by means of a kind of autointerruption, we have the vagus acting as an antagonist to the autonomy of the center. If the vagus endings in the lungs are stimulated by a deep breath inspiration is inhibited by way of the vagus and expiration is made possible.

In the sphere of the upper digestive tract, the vagus can influence not only the secretions but also the state of motility and contraction of the smooth muscle. It is known that autonomic stimuli increase the secretion of the gastric mucous membrane, the result being hypersecretion with or without hyperacidity. Vagal stimulation may also cause turbulent gastric peristalsis, which may readily change into atypical (retrograde) peristalsis and may even manifest itself in vomiting. No doubt the occurrence of folding of the gastric musculature, which is caused by an increased tone in the stomach, due to a similar action.

Since we know that the opening of the pylorus is dependent upon the degree of acidity of the stomach contents, we see that there must exist a relation between the activities of the pylorus and the tone of the vagus. That the cardiac musculature and the sphincter pylori are supplied by the autonomic, particularly in man, cannot be denied in the light of the good effect of atropin upon pylorospasm and cardiospasm. Furthermore, vagus stimulation causes spasm of both of these sphincter muscles.

Concerning the dependency of the motility of the esophagus upon the nervous system little is known experimentally. Irritation states of the esophageal musculature (esophagospasm) are relieved by drugs which paralyze the autonomic system. Coördination of the movements of swallowing, particularly of the progress of food from the mouth to the esophagus, is a function of the swallowing center which is activated by stimuli going from the posterior pharyngeal wall. The clinical significance of this fact will be considered later.

The mechanism of the intestinal movements is hidden in uncertainty. Its activity is regulated not only by the vagus, and the splanchnic nerves of the sympathetic system, but also by the automatically acting plexi of Auerbach and Meissner. Hence certain drugs, such as ergot and the substances of the digitalis series (Magnus), may produce motor activities by direct action upon the intestinal musculature without interference of the nervous apparatus. If one stimulates the motor vagus endings in the intestine by pilocarpin, or physostymin, the activity of the rolling movements of the intestines, particularly of the small intestine, is increased and in this manner the emptying of the contents accelerated. Under other conditions, however, a tonic spasm of the sphincters may result from the existence of too much tonus, and a spastic condition of the gut will result. The opposite effect is observed following the administration of atropin, which paralyzes the vagus and depresses and quiets the intestine. It is readily seen, therefore, that the action of atropin will be best observed in (such) instances where an increased tonus of the vagus, or vagotonia, has led to an abnormally increased tonic peristalsis. If, on the other hand the tone of the vagus is low (atony of the intestines) cutting its influence off by atropin is of little avail. In view of the fact that atropin stimulates the ganglion cells of Auerbach's plexus, it may, in case of atony, cause the strengthening and slowing of peristalsis. Finally, it is of significance to clinicians to know that pilocarpin, in animals at least, may increase the secretions of the lower intestinal segments.

Autonomic stimuli cause spasm of the smooth muscles of the gall bladder and of the pancreatic duct. The influence of the nervous system upon the secretions of the liver and those of the mucous membrane of the gall bladder is not known with certainty, but pilocarpin increases pancreatic action, in contrast to the action of atropin and adrenalin.

The lower segments of the intestines (the descending colon, sigmoid and rectum), as well as the bladder and genital organs, receive their autonomic stimuli through a special nerve, the pelvic. Stimulation of this nerve evokes spasm of the sphincter ani, contraction of the detrusor of the bladder and simultaneous opening of the sphincter vesicæ and erection of the penis.

A few words remain to be said regarding the connection of the autonomic system with the blood and with metabolism

(Stefani). Pilocarpin, a vagotropic substance, causes eosinophilia (Neusser⁵) while atropin and pilocarpin cause this to disappear.⁶ It is also an established fact that pilocarpin can arrest adrenalin glycosuria.

Inasmuch as experiments upon the influence of the vagus upon metabolism have been carried out almost exclusively upon lower animals, it is difficult to attempt an account of its action. There is, however, no doubt that owing to its close relations to the glands of internal secretion, the autonomic nervous system has a marked influence not only upon the pancreas and thyroid glands, but also upon the entire mechanism of metabolism.

Although in the first chapter brief mention was made of the fact that all the bodily organs are double innervated, *i. e.*, have a nerve supply from each of the great antagonistic systems, the autonomic and the sympathetic, it must be emphasized again that though as yet only one of these antagonists has been considered, there still remains the fact that every visceral organ is supplied by sympathetic fibers, which work antagonistically to the autonomic supply.

Hence it may be stated that the normal progress of functioning of visceral organs is a well regulated interaction between two contrary acting forces. Too much of one, or too little of the other will result either in motor or secretory inhibition or stimulation and may bring about a condition of disease. Since this plus or minus condition is to be seen as the expression of an increase or decrease of tone the degree of difference between the state of equilibrium and the extremes of stimulation in one direction or another, autonomic or sympathetic, serves as an index of the state of tone in one or the other of these symptoms. It appears to be possible for variations from the normal equilibrium to exist without causing disease.

5. *Diagnosis of Vagotonia in Man.*—In the course of investigating the varied reactivity of different patients to pilocarpin hydrochloride (gm. 0.01 by hypodermic) it has been found that those who react with sweating and salivation also show other symptoms which in all probability point to an increased tonicity of

⁵ Neusser, E., Hämatologische Studien, Wiener klin. Wochenschrift, 1893, Nos. 3 and 4.

⁶ Bertelli, Falta, u. Schweeger, Über Chemotaxis (Wechselwirkung der Drüsen mit innerer Sekretion, 3 Mitteilung), Zeitschrift f. klin. Medizin, 1910, Vol. 71, Hft. 1 and 2.

the vagus. Often normal individuals, who on the basis of an over-reactivity to pilocarpin were suspected to be vagotonic, unexpectedly showed, on more careful search, such symptoms as hyperacidity, eosinophilia, bradycardia, mild arrhythmias, particularly respiratory, or sluggish bowel action, approaching spastic constipation, all of which were borne by the patient without comment and who complained only of the sweating and salivation.

Whenever pathological conditions, which could readily be interpreted as the result of autonomic stimulation existed, the susceptibility to pilocarpin was found to be very great. Among these patients are such as seek the physician's aid for troublesome salivation, pylorospasm, the discomforts of hyperacidity, bronchial asthma, spastic constipation, gall stone colic, gastric crises, etc. Furthermore, latent pathological disturbances were frequently made more acute by an injection of pilocarpin. In a case of beginning tabes dorsalis a mild form of crisis resulted from an injection of pilocarpin; in another case a typical attack of bronchial asthma was provoked by an injection. Later on it was discovered that similar instances had occurred the significance of which had not been appreciated. Furthermore, it is to be observed that pilocarpin may increase the various symptoms just spoken of to such a degree as to cause annoying discomforts, such as a feeling of pressure in the gastric region, combined with the lasting pains of hyperacidity, states of anxiety in vaso-motor angina pectoris, etc. The fact that atropin exerts a beneficial effect upon most of the symptoms which have been described is a further proof that most of them are ascribable to autonomic stimuli.

These symptoms show that in individuals who are hypersusceptible to pilocarpin there are evidences of a condition of increased tone in the entire autonomic system. Furthermore, they point the way by which other manifestations of spontaneous increase in irritability or tonus in other parts of the autonomic systems may be recognized, since it seems probable that the condition of increased vagus tone is not solely local, but exists throughout the entire autonomic system. As a matter of fact, many instances of increased tonus or conditions of spasm were found in regions which previously have not been heeded.

In the following paragraphs, those symptoms occurring in man which are indicative of a departure from the normal will be considered in the same order as in the section on physiology.

Eye: The tension of the zone of Zinn or stimulation of the ciliary muscles, evoked by activity in the autonomic system, causes an increase in the sphericity of the lens.

If the ciliary muscle goes into a state of spasticity the near point of the eye will become nearer, due to increased curving of the lens. The accommodation spasm which is seen in young people as the result of steady work with objects placed close to the eyes may be increased—possibly discovered—by the use of pilocarpin, and may be relieved by atropin. Aside from spasm, we may say that the tonus is increased when the paralyzing action of atropin is but transitory, and when the strong autonomic tonus soon overcomes the paralysis due to atropin. This state of affairs which is very frequently observed in young individuals with accommodation spasm is closely related to that condition in old people in which the action of atropin is a very lasting one, because the tonus remaining in the ciliary body is but small. Thus the visible effect upon the width of the pupil cannot be great, since omission of the already small amount of tonus cannot cause a difference of great degree. By analogy, similar differences may be expected from the use of pilocarpin and cocain. The paresis of accommodation during convalescence from various severe diseases, as for example diphtheria, must be mentioned at this point. When one considers that pilocarpin is used as a curative substance under such circumstances and has beneficial results, one is justified in believing that the result is due to a diminution of tone in the autonomic nervous system.

The Löwi phenomenon⁷ might be expected to be positive in just such cases. It is well known that in the normal eye adrenalin cannot overcome the permanent tonus of the sphincter pupillæ or of the muscles of accommodation. Only when the tonus of the sympathetic is increased generally, as for example in de-pancreatized dogs, can adrenalin, acting as a stimulant of the sympathetic nerve to the dilator pupillæ, have its full mydriatic action. In man as well one may find this mydriatic action. Löwi himself described this action in several cases of Basedow's disease and of diabetes. If on the contrary autonomic spasm existed, the pupil was myotic. That the state of excitability of the autonomic part of the oculomotor nerve may be influenced from afar may be observed from the fact that when there is a rise in tonus in other

⁷ Löwi, Arch. f. exp. Pathol. u. Pharm., Vol. 59, p. 300.

parts of the autonomic system, there is an overflow of energy which manifests itself in constriction of the pupil. An example of this was seen in cases of bronchial asthma or gastric crises. In connection with the latter, Freidreich has observed that an acute myosis is almost a typical symptom of gastric crises. Just as atropin has an inconstant action upon the ciliary body, so it may have the same upon the pupil. It is well known, furthermore, that in old people it is very hard to obtain an atropin mydriasis.

(To be continued)

Pertiscope

Review of Neurology and Psychiatry

(Vol. XI, Nos. 3, 4)

1. Multiple Neuromata of the Central Nervous System: their Structure and Histogenesis. ALEXANDER BRUCE and JAMES W. DAWSON.
2. The Differentiation of Cells in the Cerebrospinal Fluid by Alzheimer's Method. D. K. HENDERSON and WINIFRED MUIRHEAD.

Multiple Neuromata of the Central Nervous System.—During Dr. Alex. Bruce's lifetime a full investigation had been made of the spinal cord of the case which is the subject of this paper. The characters of the neuromata and their connections with the aberrant nerve fibers present had also been considered. It was not until after Dr. Bruce's death, however, that the medulla was examined and the younger nodules present discovered. Dr. Dawson is thus responsible for that part of the paper which deals with the bearing of these latter observations on the origin of the tumors and on the significance of the underlying processes in relation to the question of the embryology of nerve fibrils generally.

The article is continued through five numbers of the Review and is too long for a complete abstract. It is divided into three parts: I. Histological Study of Multiple Neuromata of the Central Nervous System. II. Interpretation of Observations and Conclusions. III. The Genesis of Peripheral Nerves.

The paper is founded on material derived from a patient who had suffered from spastic paraplegia, and in whose spinal cord, medulla oblongata, and pons, multiple fasciculated neuromata were found. In these nodules no ganglion cells could be traced, and nerve fibers, of the structure of peripheral nerves, were present in different stages of development. Inasmuch as the elements of a tumor differ from the tissues in which they take their origin, and the diversity frequently consists in a return to the embryonal phases of the elements themselves, it seemed necessary, in considering the case, to study the literature bearing upon the development of peripheral nerves in order to arrive at a true solution as to the genetic relation of the elements. Further, as in regeneration of nerves these embryonal phases of development are often reproduced, the literature on the regeneration of nerves after section was next investigated. And, finally, as pathological histology has often shed light on normal tissue development, the literature bearing on tumors related to nerves has passed under review. Aided thus by collateral evidence adduced from the three sources of embryogenesis, regeneration, and tumor formation, an endeavor has been made to give an interpretation of the histological picture which a study of numerous nodules revealed.

In Part I, histological study of multiple neuromata of the central nervous system, under "spinal cord," are considered: (1) Nodule formation: (a) Disposition of the fibers. (b) Structure and mode of formation. (c) Origin of the fibers. (d) Distribution. (2) Fibrosis associated with the nodules. (3) Fibrosis of the intra-medullary portions of the anterior and posterior roots. (4) Sclerosis. And under "medulla ob-

longata and pons" are considered: (1) Isolated nucleated patches. (2) Changes in relation to the intra-medullary course of sensory roots. (3) Patches composed of interlacing nucleated fibers and fusiform nucleated elements. (4) Nodule formation. (5) Changes in relation to the superficial origin of motor cranial nerves. (6) Fibrosis.

In Part II, interpretation of observations and conclusions, the authors state that when they began their investigation they accepted the classical teaching of His and Cajal that the axis-cylinder is an outgrowth from the central cell and that its free end terminates in an incremental cone of growth. A prolonged study of their preparations and the further light shed upon them by research into the literature of the genesis of the nerve fibers in the embryo, in regeneration, and in tumor formation, led them, however, to the following conclusions: that fusiform nucleated cells linked on to one another have formed embryonic nerve fibers; that in these nucleated fibers, which show very distinctly in their segmental structure their origin from individual cells, have differentiated to a greater (in the cord) or lesser (in the medulla oblongata and pons) degree the specific nervous elements—axis-cylinder and myelin sheath; and that function is essential to the complete differentiation of the nerve fiber. As the genesis of these cells cannot be traced to any of the specific elements of the tissue, they suggest that the fusiform nucleated cells which build up the nucleated tubes and nerve fibers are indifferent cells of the value of peripheral neuroblasts—according to the cell-chain conception—which have wandered into the mesodermic tissue forming the *anlage* of the vessels and of the connective tissue constituents of the cord, and that, later, they develop their latent activity.

The multiplicity of the nodules favors this mode of origin and the presence of several anomalies—the malformation in the pons, the glia islets in the spinal pia, and the heterotopia of ganglion cells—lends countenance to the correctness of the assumption that these, together with the neuromata, must be regarded as developmental anomalies.

Their study, then, they conclude, is a confirmation, from the aspect of a pathological new formation, of the multicellular structure of the peripheral nerve fiber.

The supporters of this view claim that the neurone conception is thus placed in its true light without necessarily destroying it: "Elle réduit la doctrine des neurones à sa véritable valeur sans l'ébranler." The neurone would therefore no longer be looked upon as a structural unit but its trophic autonomy is retained.

The Differentiation of Cells in the Cerebrospinal Fluid by Alzheimer's Method.—The article is accompanied by two colored plates. The author's summary is as follows:

1. The qualitative method of cell examination as devised by Alzheimer affords facilities for an accurate differentiation of the various types of cells contained in the cerebrospinal fluid, and promises to be of considerable assistance in the diagnosis of various nervous and mental diseases.

2. In general paralysis a greater variation in cell types was seen than in any other psychosis, but a similar picture to that of general paralysis was obtained in cases of tuberculous meningitis; such cases, however, do not complicate the diagnosis of general paralysis.

3. Plasma cells and gitter cells seem to be characteristic features of general paralysis, and were found to be constantly present; in cerebral syphilis these two types of cells have been found by other observers, but

apparently not in such large numbers or so constantly as in general paralysis.

4. We cannot corroborate the assertion of Rehm that plasma cells do not occur in *tabes dorsalis*, as we have demonstrated them in two out of three cases; on the other hand, we did not find gutter cells in *tabes dorsalis*, as opposed to general paralysis, and this may be a point of differential value.

5. Our material is too scanty to warrant us arriving at any definite conclusions, but further study along this line would appear to offer a wide field for investigation.

(No. 5)

1. Multiple Neuromata, etc. (continued).

2. A Case of Cerebral Syphilis Occurring Six Months After the Initial Lesion. DR. MENAS S. GREGORY and DR. MORRIS J. KARPAS.

1. *Multiple Neuromata* (continued).—In this number and the two following numbers the third part of the paper, "The Genesis of Peripheral Nerves," is considered. An excellent review of the literature is first given and the subject treated in this order: (1) Embryogenesis. Note on the genesis of fibers in the central nervous system. (2) Histogenesis in regeneration. Note on the regeneration of fibers in the central nervous system. (3) Histogenesis in tumor formation: (a) Ganglio-neuroma. (b) Neuroma. (c) Neuro-fibroma. Note on the genesis of fibers in tumors of the central nervous system. (a) Glioma and neuro-glioma. (b) Neuroma.

(No. 7)

1. The Spread of Infection by the Ascending Lymph Stream of Nerves from Peripheral Inflammatory Foci to the Central Nervous System. DRS. ORR, ROWS and STEPHENSON.

2. Multiple Neuromata, etc. (concluded).

1. *The Spread of Infection*.—The authors have studied seven cases post mortem. The findings are reported somewhat in detail. The cases were: (1) Carcinoma of the tongue with suppuration in the tissues; (2) erysipelas of the face; (3) juvenile general paralysis with bedsores; (4) tubercular nodules of pleura; (5) tubercular lumbar abscess; (6) cancer of the esophagus, and (7) general paralysis of the insane with hemiparesis of the right side, empyema, and herpes zoster.

Six of the seven cases on which this communication is based show a diffuse meningomyelitis of the cerebrospinal axis, the direct result of, and anatomically continuous with, toxi-infective reaction phenomena of the peripheral nervous system. The condition, therefore, is one of meningomyelitis secondary to ascending neuritis. In one case, that of herpes zoster, the further spread of infection, which took origin in an empyema, was arrested at the posterior root ganglion, the destruction of which naturally resulted in a zone of degeneration in the posterior columns of the cord.

It has been shown by experimental infection of the lymph stream of the nerves and spinal cord that certain structures invariably showed the greatest degree of reaction, and the result of the examination of the above clinical cases coincides with our earlier observations. These structures are the loose areolar tissue covering the sheaths of nerves and the posterior root ganglia, the epidural tissue, and the adventitial elements of the veins and capillaries. The tissues furthest removed from the original toxic source suffer least of all, as do the structures protected by a fibrous

sheath; hence the signs of ascending neuritis are less marked within the perineurium of the nerves and in the substance of the posterior root ganglia; while in the spinal cord, medulla, and pons, the degree of reaction diminishes from without inwards. That portion of the cerebrospinal axis directly connected by nerves with the source of infection exhibits the highest degree of inflammation. Still the signs of meningitis may be very well marked both above and below the point of greatest intensity (case 6), but the gradual attenuation in potency of the infective agent is shown by the progressive diminution in the degree of myelitic phenomena. While, in the area of primary infection, adventitial inflammation, hemorrhage, neuroglial hyperplasia, etc., are prominent, the only evidence of myelitis in distant parts may be confined to the presence of a few round cells in the adventitial spaces, and congestion of the vessels.

C. E. Atwood (New York).

Journal of Mental Science

(Vol. 56, No. 234)

1. The International Committee for the Study of the Causes and Prophylaxis of Mental Disease. R. PERCY SMITH.
2. Insanity as Disorder of Conduct. CHARLES MERCIER.
3. A Theory of the Toxic and Exhaustion Psychosis. W. H. B. STODDART.
4. The Treatment of Melancholia by the Lactic Acid Bacillus. T. GEORGE PORTER PHILLIPS.
5. The Psychology of Freud and His School. BERNARD HART.
6. On the Functions of the Optic Thalamus and the Corpus Striatum. JAS. V. BLACKFORD.
7. Some Points Concerning the Diagnosis and General Treatment of the Feeble-minded. W. R. DAWSON.
8. Observations on Epileptics—Illustrating their Reaction to the Purin in Diet. LEONARD D. H. BAUGH.
9. Communicated Insanity. ARTHUR W. WILCOX.
10. Examination of the Cerebrospinal Fluid as an Aid to Diagnosis. Protein Reaction described by Ross and Jones—John Turner.
 1. *Causes and Prophylaxis of Mental Disease*.—A history of the formation and development of the International Committee and a discussion of the policy and object of the same.
 2. *Insanity as Disorder of Conduct*.—The writer places emphasis upon conduct disorder rather than delusion formation alone or mind disorder as the criterion in deciding whether or not a person is insane. He regards delusion formation unaccompanied by disorder of conduct as not necessarily an indication of insanity. Considerable discussion of this paper follows, much of which calls attention to the fact that one should go back of the conduct disorder and find the delusionary, hallucinatory or what not basis.
 3. *The Toxic and Exhaustion Psychosis*.—The conclusion is reached that the peripheral anesthesia and imperception of various senses found in acute confusional insanity results from an increased resistance at the synapses of the nervous system. As therapeutic proof of this theory he has in about a dozen cases diminished the loss of sensation and also the hallucinations by repeated hypodermic injections of strychnine.
 4. *Treatment of Melancholia*.—The author states that the impaired metabolism with its toxemia, the constipation and faulty alimentation

which accompanies "melancholia," yields readily to treatment by ingestion of vigorous cultures of the lactic acid bacillus under suitable conditions of diet. After describing the preparation and administration of this treatment, he concludes that it has a beneficial effect (1) by diminishing the amount of toxins absorbed from the intestinal tract; (2) by promoting rapid and easy assimilation of food material with a resulting increase in weight. He claims that the course is shortened and the prognosis made better.

5. *The Psychology of Freud and His School.*—An able exposition of the general principles of Freud's teachings with an explanation of such important elements as complexes, the censor, theory of dreams, association test, psychoanalysis and the like.

6. *Optic Thalamus and Corpus Striatum.*—After a discussion of the developmental and anatomical relations of the basal ganglia, the conclusions are reached that the optic thalamus is (1) intimately connected with the sensation of sight, forming by some of the cells relays between the retinae and the cells in the visual cortex; (2) center of association between sight and touch, and perhaps the muscular sense; (3) indirectly through the representative cells in the cortex, in which these associations are permanently registered, it makes possible those ideas of the qualities of things without which thought, as we know it, would be impossible. The hypothesis is also advanced that the corpus striatum is responsible for the association of muscle sensation, and through it the cortex is supplied "with the associated material for the recognition of our space and numerous muscle-sense relations, and so, ultimately, for the material for all the higher and more abstract thoughts."

7. *Diagnosis and Treatment of the Feeble-minded.*—This class is said to constitute about 40 per cent. of the "aments" in the United Kingdom. In considering the diagnosis such bodily signs as smallness of size, malnutrition, defects of shape and unevenness of development, with awkwardness of movement and various malformations are important, but, "on the other hand some feeble-minded persons are perfectly well formed and even comely." Among the important abnormalities of mind are the defect of the power of attention, causing the inability to concentrate the mind upon anything for any length of time, the lack of reasoning power, emotional instability, lack of will power, etc., the different grades being simply different degrees with arbitrary subdivisions. Medical treatment, except in the case of cretins, and surgical treatment are equally powerless, aside from indirectly building up the general health and correcting physical abnormalities. Certain classes may be benefited by special schools and later on "after care." A large group comprising such as the delinquents, females of child-bearing age, inebriates, epileptics, those subject to attacks of insanity, will need care in special institutions. The need of the detention of chronic inebriates to prevent the propagation of defectives is emphasized.

8. *Observations on Epileptics.*—The writer concludes after observing the effect of diets "poor," "moderate" and "average" according to their purin content, (1) that purin poor diets are suitable for the majority of epileptics, lessening the tendency to serial fits, confused states and dream states; (2) that the slow recuperation seen after a breakdown when on a purin average diet, supports the hypothesis that when taxed with a diet average or rich in purin, failure of the organism to carry out metabolic functions plays a considerable part in the production of the symptoms.

9. *Communicated Insanity*.—"The unlawful and in every way extraordinary conduct of the suffragettes" is called "the latest example of an epidemic of contagious political insanity." After citing cases of "folie à deux" from the literature, the writer describes in detail that of a wife who "infected her husband" with paranoic ideas.

10. *Examination of Cerebrospinal Fluid*.—Turner calls attention to the great value for early diagnosis of general paralysis, tabes or cerebral syphilis of the Ross-Jones protein reaction and the cell count of the cerebrospinal fluid. His results in the examination of the spinal fluid of the various psychoses were not unusual.

W. C. SANDY (Kings Park).

Deutsche Zeitschrift für Nervenheilkunde

(49 Band, 3 Heft.)

1. Clinical and Serological Examinations upon the Diagnostic Importance of the Weil-Kafka Hemolytic Reaction in the Cerebrospinal Fluid. MERTENS.
2. The Clinical Recognition of So-called Latent Syphilis. GRAVES.
3. Clinical Study of the Superficial Location of Brain Tumors and upon the Suppression of the Babinski Toe-phenomenon in Cortical Hemiplegia. BYCHOWSKI.
4. A Case of Accessory Paralysis through a Singular Stab-wound. KAISER.
5. The Proximal Type of Brachio-crural Monoplegia. SÖDERBERGH.

1. *Weil-Kafka Hemolytic Reaction*.—In 1911 Weil and Kafka reported the results of their studies upon the sheep-blood dissolving normal amboceptor in the cerebrospinal fluid in cases of progressive paralysis and meningitis. Mertens has made a careful study of the reactions in 89 cases in various diseases which he has grouped in nine tables. These diseases include three varieties of meningitis, streptococcic, epidemic and tuberculous; dementia paralytica, juvenile paralysis, tabo-paralysis, tabes dorsalis and cerebrospinal lues. Among other diseases studied are epilepsy, alcoholism, apoplexy, beri-beri and multiple sclerosis. Eight tables are given and these include the Wassermann reaction in the serum and cerebrospinal fluid, amboceptor in the cerebrospinal fluid, phase I and Pandy, together with a lymphocytic count. The result of this author's work showed—(1) In acute non-luetic meningitis, in 100 per cent. of the cases normal amboceptor appeared in the cerebrospinal fluid and in many cases also complement. (2) In paralysis alone in 79 per cent., in paralysis and tabo-paralysis together in 81 per cent. of the cases normal amboceptor appeared in the cerebrospinal fluid. (3) In a percentage of cases of cerebrospinal lues difficult to determine, and in a very small number of cases of tabes dorsalis, the Weil-Kafka hemolysis reaction may appear.

2. *Clinical Recognition of Latent Syphilis*.—Graves writes of syphilis as distinguishing itself from all other diseases, with the possible exception of leprosy, by its duration. But few diseases exist which it does not resemble and which it has not the power to modify. As to the laboratory methods, when we know their limits, then it shall be possible to estimate their true worth. In our studies certain difficulties have existed and these are not yet cleared up. They are concerned with (1) Our understanding of syphilis in its hereditary and acquired forms. (2) Our belief that it is curable and our views concerning its contagiousness. (3) Our method of study.

During the period of relative tolerance of the virus, the author searches for the syphilitic syndrome which he states manifests itself as symptoms (a) of a general nature, (b) of the vascular system, (c) those observed in the nervous system. Under (a) is included paleness and pigmentation. The latter is seen most frequently upon the neck, occasionally upon the forehead and at other times upon the face and body. The great frequency with which pigmentation appears upon the neck, marks it as one of the clinically valuable signs of lues. (b) "The most important cause of infectious disease of the vessels is syphilis." (c) Symptoms of the nervous system are considered under (1) alterations of the pupils; (2) changes in sensibility and lassitude; pains coming and going in the neck, knees and shoulders; spasmodic feelings in the muscles; hyperesthesia, hypesthesia and paresthesia. (3) Disturbances of the reflexes. Beyond the variations of the physiological reflexes there appear the Babinski, Oppenheim and Gordon toe reflexes.

The author believes that the disease can usually be determined clinically by the presence of paleness, vessel changes, pigmentation, disturbances of nutrition, sensibility and reflexes, and by changes in the pupils.

3. *Superficial Location of Brain Tumors and Suppression of the Babinski Toe Phenomenon.*—A case is reported of left-sided hemiplegia and Jacksonian epilepsy with absence of the Babinski reflex, which condition had existed for six years. Enucleation of an endothelioma of the dura relieved the epilepsy. There was an amelioration of the parietic condition for three years without a Babinski and then an increase of the paralysis with a positive Babinski for two years. Autopsy showed a depressed button of bone at the seat of operation attached to the brain substance by strands of connective tissue. The button of bone moved with the temporal muscle and probably was responsible for secondary changes in the brain substance. These secondary changes caused degeneration of the pyramidal tracts and were responsible for the positive Babinski. The injury to the dura at the primary operation may have played a deleterious part in the subsequent changes. The author asks whether the button of bone is not replaced too soon after trephine openings have been made, as in certain cases the danger of cerebral hernia is small, or the seriousness of such a hernia, even if it does occur, has been much exaggerated. The negative Babinski is explained by the superficial and non-destructive character of the lesion as first noted.

The author reports a second case in which a glioma was removed from the right psycho-motor zone of a woman who had had left-sided Jacksonian attacks and a flaccid paralysis of the left side without Babinski. The lack of Babinski was considered as of favorable omen, speaking for the superficiality of the tumor. The patient made a good recovery and several months after the operation had had no attacks, although there was a paralysis of the left arm. In this case the tumor to some extent had involved the cortex.

4. *Accessory Paralysis through Stab-wound.*—The author reports a case where a wound behind the ear by the point of an umbrella caused a right-sided paralysis of the palate, the epiglottis, the larynx, a partial paralysis of the right trapezius in the upper and lower third, and the right sterno-mastoid, especially the clavicular part. On account of the isolated nature of the paralysis and the absence of severe constitutional symptoms, together with the direction of the wound, the author diagnosed an extra-cranial isolated injury of the spinal accessory nerve in its inner and outer

branches. He concludes that the outer branch supplies the upper and lower thirds of the trapezius, and perhaps a few acromial fibers of the middle third and the clavicular fibers of the sterno-mastoid. The internal branch carries motor fibers only, and, so far as was determined by a unilateral lesion, furnishes all the motor part of the vagus. The facial nerve has nothing to do with the innervation of the palate.

5. *Proximal Type of Brachio-crural Monoplegia*.—The author reports five instances where a cerebral monoplegia affected the proximal portion of the arm more than the distal. Three of these were due to brain tumors, one to ligation of the superior longitudinal sinus and one to traumatism. In two of the cases the finger movements were quite intact. According to this author there are now seventeen cases of this type in the literature. Its existence supports Munk's contention that there is a cortical projection-field representing the motility of joint-segments and complicates the diagnosis between cerebral and spinal paralyses.

YAWGER (Philadelphia).

Archiv für Psychiatrie und Nervenkrankheiten

(Band 51. Heft 1)

- I. Contribution to the Study of Pseudo-sclerosis (Westphal-Strümpell) Especially in its Relation to the Peculiar Disease Process Characterized by Pigmentation, Liver Cirrhosis, and Mental and Nervous Disorders—(Fleischer). A. WESTPHAL.
- II. The Histology of Familial Myoclonus-epilepsy. FR. SIOLI.
- III. Pathological Alterations of the Brain in Chronic Chorea and in Choreic Phenomena in Children. E. v. NIESSL-MAYENDORF.
- IV. Osteomalacia and Psychoses. Concluded. W. M. VAN DER SCHEER.
- V. Differences between the Blood Serum of General Paralytics and of Dementia Præcox Patients in Relation to the Releasing of Immune Hyalosins. VADISLAUS BENEDEK and STEFAN DEÁK.
- VI. Worth and Significance of the Karoven Reaction in the Diagnosis of Syphilis and Progressive Paralysis. FRANZ v. VERESS.
- VII. The Course of Certain Cerebral Tracts and Especially of the Motor Speech Paths. G. MINGAZZINI.
- VIII. A Case of Diffuse Sarcomatosis of the Pia. OTTO MARKUS.
- IX. A Case of Simultaneous Disease of the Brain and the Liver. SCHÜTTE.

I. *Pseudo-sclerosis*.—Westphal describes at length a case, with autopsy, of so-called pseudo-sclerosis. The autopsy revealed macroscopically nothing abnormal in the central nervous system, but microscopically certain peculiar changes in the glia nuclei, especially in the gray substance of the great ganglia of the cerebrum and of the nucleus dentatus of the cerebellum. The nuclei were enlarged, altered in shape, and lacking in chromatin. Such nuclei were also found in the cerebral cortex but not in such characteristic form. Other changes of less marked character were likewise observed. In addition to the alterations in the central nervous system, the liver was distinctly reduced in size and of cirrhotic appearance, with distinct hypertrophy of the liver cells and complete alteration of the liver tissue. Although clinically the condition was at first diagnosed as multiple sclerosis, its later development made that diagnosis unlikely. In general, the findings in the central nervous system consisted in peculiar changes in the glia nuclei as stated above, corresponding in great measure to the Alzheimer findings, but less developed than described by him. The

condition of the liver makes it probable that the disturbance leading to both conditions occurred in early life, if not in the embryo, and that the causative agent presumably exerted its influence on developing organs.

II. *Familial Myoclonus-epilepsy*.—The histological study of the nervous system of a patient dying of familial myoclonus-epilepsy described by Sioli showed a slight degeneration in the upper cervical part of the cord, the so-called Hellweg triangular tract. No changes were found in the ventral horn cells. In the cerebral cortex certain changes were found in the great pyramidal and Betz cells of the motor region, together with marked glia increase, particularly in the marginal layer. These findings are not unlike those seen in other cases of epilepsy, and therefore do not point particularly toward myoclonus. The changes in the cerebellum were more characteristic, particularly in the presence of a large lipoid mass localized in the neighborhood of the nucleus dentatus and extending into the white matter of the cerebellum and somewhat into the pons. It is surmised that this change is the expression of a degenerative process in the nerve substance. The question remains open, whether this lipoid is simply a chance finding or stands in casual relation to the myoclonus disturbance.

III. *Brain Alteration in Chronic Chorea*.—v. Niessl-Mayendorf has studied in great detail the brain of a woman of thirty-two suffering from a chronic chorea. He concludes that alterations of very distinct character in chronic chorea may be observed in the important tracts connecting the cortex with the cerebellum, together with alterations of the cortex of the central convolutions and associated nuclei in the cerebellum.

IV. *Osteomalacia and Psychoses*.—In an exhaustive paper running through two numbers, van der Scheer discusses osteomalacia and psychoses with their relationship. Not only has he brought original contributions of his own to the subject, but he has also tabulated the cases described in the literature. A bibliography comprising 299 references is appended to the article, which on account of its detail and technical character does not permit of adequate review.

V. *Blood Serum in General Paresis, and in Dementia Præcox*.—Benedek and Deák have undertaken to determine the chemical differences between the blood serum of persons suffering from general paralysis and those suffering from dementia præcox. From their research, it appears that certain very distinct differences exist in the two types of disease, for the details of which the reader must be referred to the original article. Such researches no doubt may pave the way toward a final determination between the conditions existing in the body in various diseases of outwardly similar character. The technique is, however, too complex at present to permit of practical utility.

VI. *Karoven Reaction in Syphilis and Progressive Paresis*.—This article is an elaborate investigation of the Karoven reaction, and likewise does not permit of detailed review. The conclusions are summarized in eighteen paragraphs.

VII. *Course of Certain Cerebral Tracts*.—This article by Mingazzini, extensively illustrated, is an anatomical study of the course of certain fiber tracts in the brain. For the student of anatomy it will be of value, but like many such studies it cannot as yet lay claim to practical usefulness.

VIII. *Sarcomatosis of the Pia*.—Markus describes a case of sarcomatous disease of the pia, and points out the extreme difficulty of an accurate diagnosis on account of the diversified clinical picture naturally induced

by the varying location of the individual tumors. The various forms in which sarcoma may appear in the central nervous system are grouped and briefly discussed. This is followed by the report of a case which forms the basis of the paper. The symptomatology is described and the difficulty emphasized of determining during life a satisfactory clinical diagnosis. The paper is a brief and useful discussion of a somewhat unusual affection of the nervous system, which should be considered in those conditions where the symptomatology does not conform to recognized types of disease.

IX. *Simultaneous Disease of Brain and Liver.*—Schütte describes an unusual case of simultaneous disease of the brain and of the liver. The association is an interesting one and lends weight to the hypothesis that a common cause led to the brain and liver disease. The lesions of the brain were diffuse in character and of interest from a histological standpoint. The liver showed increased consistency, roughening of the surface, and an increase of connective tissue. It was not possible to regard syphilis as a cause of the conditions found post mortem.

E. W. TAYLOR (Boston).

MISCELLANY

ABSENCE OF THE OCULO-CARDIAC REFLEX IN TABES. M. Loeper and A. Mougeot. (*Le Progrès Médical*, December 27, 1913, p. 675.)

By the term oculo-cardiac reflex is meant the slowing of the cardiac rhythm which follows almost immediately on firm compression of the eyeball; it is present in fully 60 per cent. of normal persons. The reflex was studied clinically and experimentally by B. Aschner in 1908; he concluded that it is a true trigemino-vagus reflex. Loeper and Mougeot have found that out of twenty-one cases of tabes presenting the Argyll-Robertson pupillary phenomenon the oculo-cardiac reflex was absent in nineteen and was only very slightly marked in the remaining two, amounting to a slowing of only two beats per minute. In a table they give particulars of the state of the knee and ankle-jerks, corneal reflexes, pupils, pressure-pain sensibility of the eyeballs, and presence or absence of aortic lesions. More than half of the cases showed loss of the pressure-pain sensibility of the eyeballs. The writers have found that the oculo-cardiac reflex is occasionally absent also in exophthalmic goiter, diabetes, and plumbism. They regard the loss of this reflex in tabes as being due to a mesencephalic lesion, analogous to the A. R. pupil, and a sign of upper tabes. Our present knowledge of the oculo-cardiac reflex may be summarized thus: It is present in fully 60 per cent. of normal persons, and gives in them a slowing of the cardiac rhythm of from six to eight beats per minute; it is normal in the paradoxical tachycardia of arterial hypertension (Mougeot); present in bradycardia of nervous origin; marked in hypervagotonic patients; excessive usually in exophthalmic goiter and also in its incomplete forms, and occasionally in tuberculosis, syphilis, and articular rheumatism (Milian and Gautrelet); is commonly lost in tabes, especially if the A. R. pupil be present, occasionally lost in exophthalmic goiter, diabetes, and plumbism (Loeper and Mougeot); its absence is a sign of hypersympathicotonus (Miloslavich); it is absent in bradycardia of myocardial origin (Petzetakis, 1914): he finds that compression of the right eyeball gives a much greater slowing than compression of the left and an even greater one than simultaneous compression of both eyeballs. Finally, the oculo-cardiac reflex appears to be free from danger, and for the most part not seriously trying to the patient.

LEONARD J. KIDD (London, England).

A DIRECTLY EXCITABLE REGION IN THE HUMAN ENDOCARDIUM. R. Argaud.
(Compt. Rend. d. l. Acad. des Sciences, 1913, CLVI, p. 1787.)

Argaud observed a spontaneous contraction of the exposed heart of a man, aged twenty, forty-five minutes after decapitation; from this time the heart did not contract unless it were stimulated mechanically; the stimulus was most effective over the right auricle. These contractions were evoked mechanically about every ten seconds up to the fifty-second minute; they then lessened and became more and more capricious, being sometimes auricular, sometimes ventricular, and often there was a slight incoördinate fibrillation. At the sixty-second minute the heart was not mechanically excitable, and electrical stimulation of its surface gave neither contraction nor fibrillation. The heart was now opened; electrical stimulation of the endocardium of the right ventricle and of the whole of the left heart failed to evoke contraction, but stimulation of the right auricular endocardium evoked contraction of the whole of the heart. From the seventy-second to the seventy-fifth minute three induction-shocks were needed for this, and at the eighty-third minute after decapitation the heart was inexcitable. The most excitable region corresponded with the *tænia* of His, the Keith-Flack node, and the valve of Thebesius, *i. e.*, the region most rich in nerve-ganglia. Argaud has often found nerve-ganglia in the substance of the Thebesian valve of man and other mammals. He suggests that in cardiac massage, instead of the usual continuous ventricular massage, we should apply light taps by the tips of the fingers to the right auricle *at intervals*, and watch, as far as possible, for the myocardial response.

LEONARD J. KIDD (London, England).

ADIPOSITY DUE TO A JUXTA-PITUITARY SARCOMA. Laignel-Lavastine and L. Boudon. (Bull. et Mém. Soc. Méd. des Hôp. de Paris, February 19, 1914, p. 283.)

The specimen and sections were presented from the case of a woman, aged forty-one, who developed an enormous adiposity simultaneously with intracranial hypertension and blindness due to a sarcoma of the anterior fossa. The adiposity was universal, but there was normal growth of hair on head, axillæ, and pubes. The anterior pituitary lobe, although atrophied, showed histological evidence of functional activity, while the posterior lobe appears to have suffered more damage. The authors regard the adiposity as due to pituitary disturbances secondary to compression by the sarcoma of the cranial base. In the adiposo-genital syndrome the genital atrophy and the loss of the secondary sexual characters are often lacking, especially in the adult, and in this case only the adiposity was present. The authors raise the question whether the various parts of the pituitary may not really be united together physiologically as well as anatomically. "One can conceive in this way that a lesion which involves one lobe may act upon another lobe which appears to be intact." Their case illustrates the fact that the adiposo-genital syndrome is sometimes dissociated, as in the case of one of Camus and Roussy's dogs (*vide supra*). The writers regard pituitary adiposity as dependent on a secretory or excretory insufficiency of the posterior pituitary lobe.

LEONARD J. KIDD (London, England).

Book Reviews

OSIRIS AND THE EGYPTIAN RESURRECTION. By E. A. Wallis Budge, Keeper of the Egyptian and Assyrian Antiquities in the British Museum. G. P. Putnam's Sons, New York.

Moved by the fact that the knowledge hitherto obtainable of the ancient Egyptian worship of Osiris was vague and unsatisfactory by reason of its burial deep under a mass of later beliefs, E. A. Wallis Budge set himself to unravel its mysteries, and trace it as far as possible towards its source. In this he has admirably succeeded, and the result is a valuable addition to our knowledge not of the cult alone, but also of the working of the primitive mind, and its attempts at symbolical expression. In the pursuit of his task, the author has made a painstaking and thorough comparison of all the texts available, ranging from the Archaic to the Roman period, and has given a clear and well balanced account of this ancient religion with which, as he says, "was bound up all that was best in the civilization of Egypt during the Dynastic Period."

He has come to the conclusion that the faith in Osiris was indigenous to the country, as otherwise the hold which it obtained over the people would be difficult of explanation, and in furtherance of this claim has devoted several chapters to an interesting comparative study of the religious beliefs and customs persisting down to the present day among the people to the south and east, proving that the Egyptians, springing from the same stock as these more barbarous tribes, developed their religion from the same ideas and carried it to a higher level. This conception of an indigenous origin gives to the cult a deeper psychical significance, providing a clear pathway to the inner content of the life of the people, and aiding in a clearer understanding of human motives and conduct.

The origin of the myth, Mr. Budge believes, seen historically, is hopelessly lost in obscurity. Probably Osiris was a deified king, to whose worship his priests transferred the ideas of morality, justice and righteousness found in local cults, and to which later on the powers attributed to the gods introduced by foreign influence were added. Various forms of the story are to be found, but they all hark back to the original theme, which is probably an account of the actual manner of his death. Osiris was attacked, killed and dismembered by his wicked brother Set, who scattered the members broadcast, but Isis, sister and faithful wife of Osiris, loudly lamenting his fate, gathered up the pieces, and, with the assistance of her sister Nephthys, joined them together. Then by exercising her magical powers she affected union with her dead husband that she might bear him a son. This son, the great god Horus, by the ceremony of the opening of the mouth, and by giving him his Eye, which contained his soul or life, restored to life the dead Osiris, who thus came to live forever, and became king of heaven, the abode of righteous souls.

The work is copiously illustrated throughout with hieroglyphics. These are literally translated, and carry the reader through the growing faith which, with its elaborate ceremonials and majestic liturgies, shows

the upward strivings of the psyche, even through ritual which, to the mind which sees only the symbol, and cannot read the idea which shines through the symbol, may oftentimes appear gross and base.

The legend is an expression of the age-old cry of human nature for immortality. The life power was sought by Isis that she might bear a son through whose power his father might rise again and become the prototype and forerunner of his followers, who should receive from him life power, fruitfulness and prosperity in this world and attain perpetual life in a hereafter. No doubt the conception of life in the future world was gross and materialistic, but the faith embodied in the cult satisfied an undeniable need of human kind, and it is small matter for wonder that it spread not only over all Egypt, where Osiris and his consort Isis were worshipped with deepest reverence, but throughout many other parts of the ancient world.¹

The details given of the ceremonies and beliefs will well repay study, showing as they do the early working of the human psyche. Many of these details may be distasteful to the "nice" mind, for this cult of Osiris was, as all primitive religions were and are, frankly sexual. This is a phase in the development of man of which the ethnologist takes full cognizance, and is one which the psychiatrist cannot afford to overlook, either in his study, or in dealing with individuals in whom some cause, be it what it may, has made a rent in the veil between the conscious and the unconscious, and in whom primitive feelings seek to find modified expression. In his work of aiding the strivings of these suffering souls the psychiatrist should not hesitate to invoke the powerful aid to be obtained from a consideration of the symbols used by the primitive mind in its attempt to sublimate primitive instincts, and through it, though unconsciously, express its cravings for immortality, even though in so doing he may to some extent injure his own sensibilities.

The work is well illustrated and is remarkable for its clearness of expression, and wealth of knowledge of the subject. It is handsomely bound, in two volumes, well printed on good paper, and is altogether a notable achievement.

JELLIFFE.

BODY AND MIND. A HISTORY AND A DEFENSE OF ANIMISM. By William McDougall, M.B. The Macmillan Company.

The author's aim in writing this volume was to provide for students of psychology and philosophy, within a moderate compass, a critical survey of modern opinion and discussion of the psycho-physical problem, the problem of the relation between body and mind. This survey in the main, he holds, is the history of the way in which animism, the oldest, and in all previous ages, the most generally accepted answer to it, has been attacked and defended.

For the author, animism is not the primitive type of anthropomorphism, *i. e.*, the belief that all natural objects which seem to exert any power or influence are moved or animated by "spirits" or intelligent purposive beings. He adopts Tylor's exposition as given in his celebrated work on "Primitive Culture," a work incidentally of much value to contemporary psychoanalytic discussion.

¹ See *Myth of the Birth of the Hero*. Tr. by Robbins and Jelliffe: JOURNAL OF NERVOUS AND MENTAL DISEASE, 1913, p. 50 et seq.

Animism has been the foundation of every religious system and while more subtly expressed is found in the philosophies of Plato, Leibnitz, James and Bergson, and yet apparently rejected by many of these writers, who nevertheless utilize it.

The author regards the fate of animism as intimately associated with the future of religion. The belief in any form of life after the death of the body will decline as mechanistic dogmas replace animistic ones and yet as an expression of personal attitude the author states he is in sympathy with the religious attitude towards life.

It is a fascinating volume, well expressed and admirably planned, and one well calculated to fill a large gap in this overstocked world of books. From it one can get a firm grasp of the evolution of perhaps the most vital of all the empirical attitudes towards life and its values. To the neurologist and psychiatrist working with human mental machines struggling to adapt themselves in a welter of discord, disharmony and strife this volume will prove of much value. In it the psychoanalyst will find much that supports his point of view and may finish the work with the conviction that the Freudian psychological attitude towards philosophy solves the dilemma of animism and materialism which the author so richly and graphically illustrates.

JELLIFFE.

OUTLINES OF GREEK AND ROMAN MEDICINE. James Sands Elliott, M.D.
William Wood & Co., New York.

Interest in the history of medicine has been conspicuously increasing of late years and this small monograph of 160 odd pages, devoted entirely to the history of medicine of the Grecian and Roman epochs, is one of the latest and most acceptable evidences in this respect.

As the author so well says in his preface, the medical profession deserves censure for the neglect of its own history, and pity 'tis that so many practitioners know nothing of the story of their art. As Bacon said: "Medicine is a science which hath been, as we have said, more professed than labored, and yet more labored than advanced; the labor having been, in my judgment, rather in circle than in progression. For I find much iteration, and small progression."

Without any fundamental knowledge of what has been, the critical faculty on the so called new things that spring up is conspicuously absent. Had the physician been acquainted with the efforts of his predecessors many of the things that have made many doctors the laughing stock of later coming generations would have been avoided, and fads and fancies would not have been pushed to the extreme that we see them.

This well-printed and well-executed volume contains in very acceptable form some of the best knowledge of the ancients. One has only to change the symbols slightly to see that they are dealing with many of the same problems with which we deal to-day.

In no field is this need for a knowledge of what has taken place in the past more manifest than in that of nervous and mental disease, and although in this field the transformation of symbols has been very great, and the detailed information gathered enormous, yet one can see in the strivings of the Greek and Roman period of medicine similar modes of approach to our own attitudes of to-day.

JELLIFFE.

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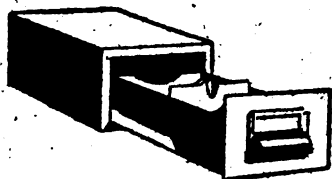
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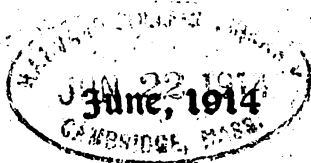
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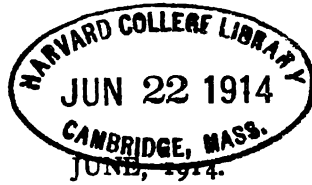
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Original Articles

DEMENTIA PRÆCOX IN THE EIGHTH EDITION OF KRAEPELIN'S TEXTBOOK¹

By H. DOUGLAS SINGER, M.D., M.R.C.P.

DIRECTOR ILLINOIS STATE PSYCHOPATHIC INSTITUTE

The large group of mental disorders classed under the title of dementia præcox has been subjected to so much study and criticism since it was first formulated by Kraepelin that it was thought worth while to consider the views expressed by this author in the eighth edition of his textbook which is dated from Munich in February, 1913, as compared with those in the seventh edition which appeared in 1902. The chapter has been largely rewritten and now occupies more than three times as much space as in the earlier volume. A small part of this enlargement is due to the inclusion of some pages upon morbid anatomy based upon the findings of Alzheimer, but in the main it consists of a close study of the clinical manifestations with a view to outlining common types.

The earlier definition of dementia præcox was "a series of disease pictures, the common characteristic of which is the outcome in peculiar states of weak-mindedness." In the latest edition Kraepelin still adheres, in the main, to this definition but he now proposes to separate off some types in which the outcome

¹ Read before the Illinois State Hospitals Medical Association, October 24, 1913.

shows certain differences. He therefore has adopted a general title to designate the whole group of disorders. This title is "Die endogenen Verblödungen" probably best translated as "endogenous deteriorations." The definition of this group is "a series of disease-pictures, the reciprocal clinical relations of which are still entirely unclear, but which show the common peculiarity that they arise from internal causes without recognizable external occasion, and that, at least in the great majority of instances, they result in a greater or less degree of psychic infirmity." This broad class is then subdivided into *Dementia Præcox* and *Paraphrenia*. We may consider these two subheadings separately.

1. *Dementia Præcox*.—The definition of the cases included here is "a series of condition-pictures the common characteristic of which is a peculiar disorganization of the inward coherence of the psychic personality with predominating damage to the affective life and the will." This in reality is identical with the older definition quoted above but emphasizes certain peculiarities of the deterioration as involving especially the interest and activity. It also serves to distinguish this group of pictures from that which is included under the head of *paraphrenia*. Kraepelin then mentions briefly that there have been many objections to the *dementia præcox* concept but claims justly that it is now very widely accepted even if with some differences of opinion with regard to detail. He admits that the name is not a very good one in that the disorders here grouped are not necessarily precocious in onset and that it is at present impossible to say that all deteriorate and none fully recover, but he points out further that until we have some more intimate knowledge of the essence of the disorder it is impossible to select a name which will not be liable to similar objections and that for this reason the title, *dementia præcox*, will suffice for the present.

In describing the general symptomatology there has been added considerably more detail all tending to emphasize the inward psychic disorganization. Much stress is laid upon the character of the sense-falsifications and the absence of coherent relation between them and the patient's thoughts. The consequence of this is a feeling of strangeness and outside influence in their production as well as a disorder in the sequence and coherence of the utterances and acts of the patient. Under the heading of the stream of thought these same evidences of disconnection and strangeness are

again strongly emphasized and more amply illustrated than in the earlier editions. In discussing the actions and conduct of the patients the same features are also made more prominent and are alluded to as disorders of will. There is no need to go into them more fully at this point as they will be again considered in relation to Kraepelin's views as to the psychopathology of these disorders.

Passing from the general symptomatology he expresses the opinion that it is now possible to still further subdivide the clinical pictures coming within this definition into different types according to the clinical symptoms, course and to some extent the outcome. He is very careful to insist that these are to be regarded only as types and not necessarily as different disorders or diseases. In the older classification we were presented with three such types, the hebephrenic, katatonic and paranoid. These are now split up into eight main forms with a few subdivisions. It is difficult within the scope of this paper to outline these very completely but an attempt may be made to give some of the main characteristics of each.

(1) *Dementia Simplex*, a group first outlined by Diem and since widely accepted. It includes a number of cases which are never brought to the alienist and continue to live in society. The definition given is "an extremely insidious impoverishment and erosion of the entire mental life." The change is usually noticed in adolescence but it may begin even in childhood. This group will include cases such as the average, or even brilliant, student who begins slowly to become slovenly and inattentive, the early promises of success are unfulfilled and life is a failure. The character changes, and the individual becomes more shy and retiring, often fretful and irritable, more and more inaccessible and indifferent without any very clear or definite signs of insanity. In fact these patients are often thought to be wilfully negligent and "mean." Bleuler devotes considerable space to the description of these cases and finds evidences of a relation to a repressed Œdipus complex which is dismissed by Kraepelin as without foundation.

The disorder is always of slow development and may lead to extreme deterioration necessitating institution care or, probably more frequently, the deterioration ceases after reaching a certain degree and only a knowledge of the earlier promise of success would permit of its recognition. The frequency of this type can

be only surmised as, in all likelihood, the majority do not come under the notice of the physician, but it is probably large.

(2) "*Silly*" (*läppische*) *deterioration*. In this type, which corresponds very closely with that described as hebephrenia by Kahlbaum and Hecker in 1871, there is "besides the progressive mental deterioration, especially marked desultoriness in thought, feeling and act."

The onset is nearly always very insidious and a change has frequently been present for many years before definite evidences of insanity are recognized. The early symptoms consist of various subjective complaints such as dulness, nervousness, headache, dizziness, fainting, with irritability and sleep disturbance. The patient becomes forgetful, obstinate, easily fatigued and cannot collect his thoughts. Sense-falsifications of desultory character occur occasionally. Depression with hypochondriacal complaints is not uncommon. The most striking disturbances however concern the conduct. The acts are often strange, absurd and unexplained, more or less impulsive. They laugh or cry without obvious cause, may commit sudden crimes and often show marked sexual excitement.

This group includes about 13 per cent. of all hospital cases and the end result is generally a deep dementia. Males are affected considerably more than females (63:37) and in 60 per cent. the onset is before the age of 25.

As will be seen from the description the group includes a considerable proportion of those cases previously classed as hebephrenic.

(3) *Simple depressive or stuporous deterioration* includes "those cases in which, after an introductory phase of depression with or without the manifestations of stupor, there develops finally a psychic infirmity." In this form the mode of onset is insidious in more than half the cases, but some 20 per cent. begin acutely especially when stupor is present. Even in these however, careful study will often show character change of some years duration before the acute outbreak. In this prodromal stage there occur subjective symptoms and complaints similar to those described for the last type.

Sense falsifications, especially auditory hallucinations, are fairly common but do not as a rule form a prominent feature. Then appear various trends of thought indicative of depression,

especially hypochondriacal complaints of all kinds. Ideas of personal unworthiness and sin leading to further delusion of consequent persecution are not uncommon. The mood is at first anxious and depressed and the patient shows a picture of "weeping despair." Some are more irritable and may be impulsively violent. Sexual excitement also occurs. The general conduct shows marked instability and unsteadiness, business is neglected, positions are changed frequently and aimless journeys are undertaken. All sorts of impulsive acts may be performed and various mannerisms, grimaces and negativistic tendencies appear. In about one third of the cases these features of negativism and command automatism result in a state of stupor which may last a variable time and are not uncommonly interrupted by transient periods of anxious excitement. Gradually the picture becomes dominated by the loss of interest and general dulness which are more or less apparent all through. The manner in which the various depressive ideas are expressed is unconvincing and they may be uttered with an appearance of more or less nonchalance in spite of the tears and complaints. Even some degree of insight is not uncommon.

The cases here included represent about 10 per cent. of all dementia præcox as seen in the hospitals and would also be included under the older title of hebephrenia. The resemblance in certain particulars to a depressed form of manic-depressive insanity is obvious and the need for care in the study of individual patients before giving a prognosis requires no emphasis.

(4) *Depressive deterioration with delusion formation.* "Cases in which the delusions are more widely developed and have a more bizarre form." The onset is similar to that in the previous type but is somewhat more frequently acute or subacute. Numerous sense-falsifications, especially auditory, but involving all senses, appear gradually or suddenly. With this there is often more or less clouding of consciousness, the grasp of the situation is incomplete, persons and the surroundings are not recognized and the patient becomes puzzled and perplexed. Upon this basis develops a wealth of delusions, poorly, if at all, systematized and often of the most absurd content. They express ideas of perplexity, sin, persecution and occasionally of grandeur.

The acts and conduct are partly dominated by the sense-falsifications and delusions but often seem hopelessly incongruous and founded upon no recognizable motive at all. Mannerisms and

negativistic traits with waxy rigidity, echolalia and echopraxia occur.

As will be seen these cases also belong mainly to the old hebephrenic type. They constitute about 13 per cent. of Kraepelin's cases.

It will be observed that in the groups thus far the pictures all represent mainly a deterioration with features of depressive or stuporous character. There are now to be described conditions in which excitement is a prominent feature. There are three forms of such states exclusive of strict katatonia which represents a combination between excitement and stupor.

(5) (a) *Circular form.* The onset may be either gradual or acute and is characterized by symptoms similar to those of the depressed forms, subjective complaints and hypochondria, sense-falsifications and delusions of depressive type. Consciousness is often somewhat clouded although many are entirely clear. Following this stage of depression there appears one of excitement. Very often there is marked distractibility, various happenings and remarks occurring in the surroundings being woven into the utterances but in a monotonous way and without leading to new trends of thought. The mood is anxious and depressed but subject to sudden severe changes. The chief characteristics are the restless, aimless excitement with numerous impulsive acts. The excitement shows considerable monotony and repetition: rubbing and touching movements, grimacing, bellowing, shouting, with verbigeration and senseless rhymes. There are evidences of suggestibility and negativism and extraordinary attitudes may be assumed. Finally the picture of excitement passes into one of deterioration which is often that of deep stupidity but the patients may remain more or less talkative and confused with various mannerisms and other negativistic traits.

The course here described of depression, excitement and dementia is interrupted by remissions with marked improvement in 53 per cent. of the cases and in 14 per cent. such remissions occur several times. Generally this happens after the initial stage of depression and there may be several such depressions separated by more or less normal intervals. As a rule following the remission the relapse starts with a period of excitement followed by dementia; more rarely a further stage of depression precedes the excitement. The total duration from onset to dementia, exclu-

sive of remissions, is generally short, sometimes only a few weeks or months, rarely one or two years.

This type has probably been included for the most part with the katatonic form and represents about 9 per cent. of all cases.

(5) (b) *Agitated type*. Cases in which "the disease begins with a stage of excitement and then at once, or after more or less numerous remissions and relapses, passes into an end-stage of dementia." A sudden onset occurs in about half the cases, and in about one third there are prodromal symptoms covering a long period.

The picture is that of excitement with irritability, the patients are uncontrollable and violent, run around making senseless incoherent speeches. The disorder may even begin with a condition of severe incoherence.

Sense-falsifications, especially auditory hallucinations, play an important part in the picture. Comprehension and grasp are often more or less disturbed and the patient appears puzzled, lost in dreams, "everything is upside down," "the world is coming to an end," etc. They then resemble closely a state of acute confusion or delirium, especially when the sense-falsifications are marked, and this diagnosis is often made.

The trend of thought is more or less in keeping with the state of puzzle, and delusions of change and influence are often expressed. Most commonly there are also grandiose ideas. The mood is generally elevated, more rarely anxious, but is subject to the most extraordinarily rapid changes. The excitement is shown by restlessness and impulsive acts and utterances very similar to those described in the circular form. This conduct seems to the onlooker almost entirely unintelligible.

These cases are said to include 14 per cent. of the total. Remissions are frequent (36 per cent.) and may last from a few months to twelve or fourteen years, mostly about three years. The final result is dementia of varying degree of severity.

(5) (c) *Periodic type*. A small group comprising about 2 per cent. of all cases and characterized by the fact that "either in the introductory stage or during its whole course the disease is markedly periodic." It is much more common in women than men and often the attacks seem to bear some relation to the menstrual periods. The onset of the attacks as a rule is sudden and they are characterized by the most intense excitement similar to that just

described. Such attacks are generally of short duration, a few days or weeks, rarely months, and are separated by intervals of apparent health lasting days, weeks or months. Gradually deterioration sets in and these cases regularly become badly demented, although often only after years.

Kraepelin states that he used to class these with the manic excitements but that the outcome is conclusive of their true classification. He also calls attention to the monotony, impulsiveness and poverty of thought shown in the excitement as guides in diagnosis.

(6) *Katatonia*. Kraepelin now restricts this name to a group of cases "in which the peculiar excitement with katatonic stupor controls the picture." He also emphasizes the fact that the so-called katatonic symptoms occur in other diseases than dementia præcox such as general paralysis of the insane and senile dementia.

The onset is acute in 41 per cent. and gradual in 31 per cent. In 47 per cent. there is an initial stage of depression with hypochondria and delusions of sin and persecution. Often also there is a stage of perplexity and confusion. Sense-falsifications especially of sight and hearing are constant. Following this there occurs, especially in males, a state of stupor and later one of excitement. Rarely the reverse order is observed. When no initial depression is present these cases usually begin with an excitement closely resembling that of the agitated form generally with elevated mood.

There is no need here to describe the well known pictures of katatonic excitement and stupor but allusion may be made to the statement by Kraepelin that one of the characteristic features of the excitement which may help in its recognition is the fact that these patients do not tend to mix in with their surroundings and all the excited acts are carried on in a small space.

The total duration is very variable. In one third of the cases remissions occur, and in some this may amount to apparently complete recovery. This occurs especially in those showing an initial stage of depression. Such remissions may last two or three years, but sometimes as long as 16 and even in one instance 29 years. They comprise about 20 per cent. of all cases.

(7) *Paranoid*. This group forms probably one of the most controversial chapters of the whole dementia præcox subject, opening as it does the whole vexed paranoia question. In his older

edition Kraepelin described two forms of this type, the second of which under the name of dementia paranoides has now been removed and included under paraphrenia. Kraepelin defers the discussion of paranoia until later and unfortunately the volume dealing with this topic has not yet appeared.

Under the *paranoid type of dementia præcox* he includes those cases "in which delusion and sense-falsification represent the chief symptoms" and which end in definite deterioration of the dementia præcox type.

As a first subtype he describes *dementia paranoides gravis* "which begins with simple delusion-formation but in the further course shows always more clearly the peculiar disorganization of mental life, and especially of the affective sphere and the will, which are characteristic of dementia præcox."

The onset is gradual in 63 per cent. and subacute in 30 per cent. Many of them show unfavorable types of character early in life, the women are prostitutes, the men vagabonds or criminals. The early symptoms resemble those of other varieties in the form of subjective complaints. Sense-falsifications appear early with numerous ideas of reference and lead to more or less well systematized delusions of persecution and in more than half of the cases of grandeur. Memory falsifications which serve to help the systematization also occur. The mood shows no very marked color and the actions and conduct correspond in part with the delusions. Nevertheless they are in part stamped with the unintelligible and extraordinary features which are so frequent in all forms of dementia præcox. As the disorder progresses there appear negativistic phenomena and many mannerisms.

This type comprises about 9 per cent. of the cases and is essentially unfavorable, all deteriorating more or less badly.

Dementia paranoides mitis, another group of about the same size as the last in which the final outcome is rather a paranoid or hallucinatory dementia instead of one with the disturbance of will and indifference of the other picture. There is less destruction of psychic personality. Almost all these cases begin in individuals of low type, the men in two thirds of the cases are chronic criminals or vagabonds and the women prostitutes. It forms one of the common prison psychoses. The symptoms are much the same as in the last type but do not lead to the same amount of deterioration.

(8) Finally there is a group to which a separate position was given by Bleuler and which Kraepelin describes as *speech confusion*. These are cases in which "the development and course correspond in general with those of dementia præcox. They differ in that the outcome is a state characterized essentially by an unusually striking disturbance of speech expression with proportionately little interference with other mental functions."

The onset is insidious and often interrupted. The patients remain clear and well oriented and sense-falsifications play no important part. They remain interested and active, the mood generally somewhat elevated, and they show a press of speech. They may answer simple questions briefly and correctly but soon run off into a string of absolutely unintelligible words and phrases. They are well ordered in conduct and generally friendly though somewhat stiff and awkward and make excellent workers about an institution.

In discussing this somewhat elaborate system of classification the first question to be answered is as to its practical value. There is no attempt to consider them as different diseases or entities and Kraepelin is very careful to make this clear. He does point out that the prognosis in the different groups is somewhat different but although this is true for groups of cases it is more than questionable whether this is of great value in dealing with any individual case. Furthermore although typical cases may be easily assignable to one or other group there are many which would be difficult to place. The principal value would, then, seem to be for descriptive purposes and for illustrating the manifold forms in which this protean disorder may occur. Personally I would hesitate to recommend it for adoption in the practical work of a hospital.

Let us now turn to consider something of the views which Kraepelin expresses as to dementia præcox as a whole. It may be said that no very radical changes are obvious and if anything, he is more conservative than before.

With regard to *etiology* the statement is made "As to the causes of dementia præcox there still to-day exists an impenetrable darkness." The relations of sex and age have undergone but little change although with regard to cases arising in old age Kraepelin leaves the question open. He has, however, removed a

considerable number of the "Spätkatatonien" and now includes them with the group of presenile psychoses.

Heredity is discussed without coming to any very definite conclusion but he seems to be opposed to regarding the disorder as a form of degeneracy. Some stress is laid upon the possible presence of some chronic intoxication in the parents such as that of syphilis or alcohol but he admits that these are only factors in a small number.

With regard to the personality of the child who later suffers from dementia præcox, Kraepelin describes especially in males "a quiet shy retiring disposition with no friendships, living only for himself." Secondly and especially in females "irritability, sensitiveness, excitability, and nervousness together with self consciousness and a tendency to bigotry." He also mentions a third and smaller group of individuals who from youth up have been dull, shy of work, unsteady, with a tendency to wrong doing, never friendly and tend to become vagrants and criminals.

The stress of civilized life has been accused of responsibility for this disease but Kraepelin asserts that it is just as common among primitive people as among the more civilized nations. He also expressed himself as against any belief in its causation by external conditions such as specific fevers, injuries, etc.

He maintains now, as before, that there is a strong suggestion of some auto-intoxication and still leans towards a relation to disorder in the sex glands, although he admits that "convincing proof is unfortunately not available." He adds "nevertheless it may be said with all caution that, on the whole, a series of facts in dementia præcox make the existence of an auto-intoxication resulting from disordered metabolism very probable." He mentions the muscle changes, increased irritability of muscles and nerves, increased tendon reflexes, blood and catabolic changes, osteo-malacia, etc., as such evidences. Some of the symptoms such as the marked variations in body weight, low body temperature, epileptiform seizures and sudden death are suggested as being similar to those of thyroid disturbance. His final conclusion is "hence the deduction is well justified that in the present state of our knowledge it is most probable that there is an auto-intoxication, sometimes insidious, sometimes more sudden in appearance." As to the source and nature of this toxin "we can at present give as

little satisfaction as in the much better understood meta-syphilitic and meta-alcoholic diseases."

With regard to the psychopathology of the disease which has been so widely, and I think fruitfully, studied, Kraepelin offers no discussion. His psychology is firmly founded upon the teachings of Wundt and he still apparently deals with an independent and separate will to the disturbance of which he ascribes the bizarrerie and inexplicable character of the disturbances in thought, feeling and act which he so faithfully portrays and emphasizes. He seems to have the impression that the cause of these extraordinary features is the auto-intoxication and that the psychology of such an individual is an entirely different subject from that of one in health.

The discussion of the views of Freud and Jung, which seem to throw such a flood of light into this dark region, are merely refused consideration. This "complex" theory is apparently absurd to Kraepelin and he says he has over and over again been impressed with the entire absence of the most natural and affect-full complexes which existed in the days of health; and then adds "of course one may here take advantage of the conception that it concerns repressed and transformed ideas—"masks (or symbols)"—whose real meaning can only be discovered by a sensitive analysis of association tests and dreams, a supposition which has little allurements for me with the present proofs."

In answer to Jung's comparison of the symptoms of dementia præcox with dreams he says "Even if it were admitted that such similarities exist in the sphere of thought and speech expression still the untenability of that assertion is so obvious on other grounds that a refutation seems the more superfluous since there is lacking any recognizable demonstration."

He seizes with avidity Jung's suggestion that a toxin might result from the disturbance in metabolism produced by the emotional upset and thinks that he has refuted this altogether by asking why, if this were so, the much greater affective disturbances seen in manic-depressive psychoses do not call forth such an intoxication. The cases are not in any sense similar for the reason that the manic-depressive disturbances are reacted to in an adequate manner whereas, according to the views of Jung and Freud, in dementia præcox the reactions are subterfuges and merely shelve the questions at issue.

His real opinion of the Freud school and theories is expressed in the following: "We meet here the characteristic signs of Freud's lines of research, the laying down of hypothetical views and opinions as if they were observed facts which are then employed for the construction of ever new and upward soaring air-castles, as well as the tendency to measureless generalization from single observations. I must openly confess that with the best will in the world I cannot follow the path of this meta-psychiatry." "Since I am accustomed to walk the firm ground of direct experience, my philistine scientific conscience stumbles in its footsteps upon objections, reflections and doubts over which the light-winged imaginations of the followers of Freud carry them without further ceremony."

With regard to *prognosis* Kraepelin now refuses to give any figures as to the number of recoveries. He bases this attitude upon the fact that no one can say when a remission is going to be permanent. They may last many years only to be followed by a relapse and eventual deterioration and hence it is wiser to wait further knowledge. He admits that these late relapses may represent fresh disease but claims that at present this cannot be established.

As to whether all the types represent one single form of disease he also leaves open and points out that most of the objections concern the paranoid types. With regard to these he admits that at first glance they bear but little resemblance to katatonic stupor, the states of excitement or to dementia simplex but insists that the final outcome in similar states of deterioration suggests a similar disease process and he compares the variations in disease picture with the similar variations observed in general paralysis, brain syphilis and manic-depressive reactions in each of which the outcome is the same for the cases in each disease regardless of the individual clinical symptoms and course.

2. *Paraphrenia*.—This new group I propose to consider very briefly as it represents a purely tentative effort to deal with some of the difficult paranoid cases. In separating these cases Kraepelin still employs the criterion of the final outcome. He says that in dementia præcox the disorganization of the psychic personality affects chiefly the affective life and will. The paraphrenic group, a small one, in spite of manifold points of accord with the manifestations of dementia præcox yet has far less influence upon

the affects and will and consequently results in much less disturbance of the inner character of mental life. The main disturbance here is with the intellectual functions. These patients even in the last stages do not show the affective dulness and indifference which represent so frequently even the earliest signs of dementia præcox. The actions and conduct are in the essence affected only by the abnormal trend of thought and mood. "Independent disturbances of the will" which tend to accompany dementia præcox in such manifold form (*e. g.*, mannerisms, impulsive acts, stereotypies, etc.) occur here only exceptionally.

(1) *Paraphrenia systematica*, characterized by the insidious onset of steadily growing delusions of persecution with later ideas of grandeur but without destruction of personality. The disease takes years to develop; ideas of reference and sense-falsifications play a considerable part in its evolution. The delusions are well systematized and may be accompanied by memory falsification. There seems to be no end-stage as the disorder continues progressively throughout life. Recovery does not occur, but it is especially emphasized that there is no loss of interest.

The close resemblance of this picture to that described by others under the title of paranoia needs but little emphasis. In speaking of the relation of paranoia to dementia præcox Kraepelin claims that there can be no difficulty in distinguishing between the two because of the absence in the former of any evidence of independent disturbances of will or of signs of affective deterioration. This distinction seems hardly to hold good with regard to paraphrenia systematica and we must await the appearance of the volume dealing with paranoia for enlightenment.


(2) The *expansive type*, characterized by the rich development of grandiose ideas, generally with heightened mood and some slight excitement. This is an extremely interesting, though small, group composed almost entirely of women and the cases have hitherto been usually classed with the manic-depressive disorders, as was done by Kraepelin himself, or with paranoia. The disorder is of slow progressive evolution and like the last reaches no end-stage and presents little or no loss of interest.

(3) *Confabulating form*, very similar to the last but characterized by the development of very marked memory falsifications.

(4) *Paraphrenia phantastica*. Under this name are included the small group of cases originally classed as dementia paranoides.

They are characterized by the development of the most phantastic and incoherent delusions. Beliefs are elaborated and maintained which seem to surpass the boundaries of possible credence. In this type again evidences of disorder of affect and will are more or less absent.

The separation of these types of "paraphrenia" from dementia præcox is based upon the absence of affective and volitional deterioration and also upon the progressive course which seems to lead to no final end-stage. The step is unquestionably consistent with Kraepelin's general principle that the end result represents the character of the disease process and it has the further advantage of removing some of the difficulties experienced by those who regard dementia præcox as a destructive brain disease. With Kraepelin we must be content to await further study to determine the justice of the step, and so long as we do not allow ourselves to be entangled in the enticing web of exact classification and regard dementia præcox, paraphrenia and their various subtypes as established disease entities we may be grateful for the clear delineation of clinical facts.



ANEURISMS OF THE VESSELS OF THE BRAIN¹

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A study of the literature reveals the fact that aneurisms of the cerebral vessels are not uncommon, the first contribution to the literature having been made by Morgagni,² as long ago as the early part of the eighteenth century, since which time many cases have been recorded.

The literature is so rich that one feels like apologizing for reporting a single case. At the same time the one, a report of which follows, presents some features of interest; chiefly as illustrating the absence of symptoms recognizable as being due to the aneurism and as showing that paralyzes which are met with in some of the cases may be coincidental rather than related directly to the aneurism itself.

B. R., age 57, was admitted to the Philadelphia Home for Incurables on June 11, 1908, and died December 10, 1911. The chief complaint was loss of power in both legs.

Father died of paralysis, otherwise the family history is entirely negative.

There is nothing in the previous history bearing on his present illness. He denied syphilitic infection.

He stated that in 1906 he had a "stroke." While walking, he turned to the left suddenly but did not fall or lose consciousness. There was immediately slight loss of power of the left arm and leg. Previous to this attack he stated there was a slight lameness of the left leg, which came on gradually.

Upon examination there was loss of power in both legs. He was able to walk but the gait was slightly spastic. Apparently there was no loss of power in the arms at the time of the first examination. There were no sensory disturbances of either the arms or legs. The knee jerks were increased, ankle clonus was present

¹ From the Department of Neurology and the Laboratory of Neuropathology of the University of Pennsylvania, and the Philadelphia Home for Incurables. Read before the Philadelphia Neurological Society, March 27, 1914.

on both sides and the Babinski phenomenon was present. There was no involvement of the sphincters at this time.

The weakness of the leg progressed so that two months before his death he was unable to walk even with crutches. The arms became slightly spastic and there was some loss of power on both sides. In the last few months of his life the bladder sphincter was at times incontinent. There was no localized wasting of the muscles. Shortly before death he was asthmatic and dyspneic and he complained of pain over the gall bladder.

At the autopsy the base of the skull was somewhat pushed out of shape. The posterior clinoid processes were pushed forward and the anterior posterior diameter of the sella turcica was shortened.



Aneurism of the Basilar Artery.

At the anterior portion of the basilar artery an aneurism was found the size of a small pigeon's egg. The aneurism was situated at that point where the basilar artery divides into the posterior cerebral arteries. The posterior communicating arteries were very small and threadlike in appearance. The diameter of both internal carotids was abnormally large.

The right kidney was much enlarged and was the seat of a

tumor in its upper portion. The left lung was infiltrated with nodular masses varying in size from a hickory nut to a hen's egg. These tumors could be readily enucleated. The plura was thickly studded with small nodules, the spleen was somewhat enlarged and the gall bladder was distended with pus and contained several gall stones. The left kidney was slightly enlarged but was not the seat of any growth. Microscopic examination of the tumors was made by Professor Allen J. Smith, who reported that the tumor was a hypernephroma.

Sections from the paracentral regions showed marked arterial change in the vessels of the cortex, consisting chiefly of perivascular round cell infiltration and thickened arterial walls. The pia in these regions was thickened, fibrous and infiltrated markedly with round cells. The blood vessel walls were thickened and some fresh hemorrhages were noted in the pia. In the main the pyramidal cells and Betz cells were not diseased.

Microscopic studies were also made of the pons, medulla oblongata, and the spinal cord.

The pons half an inch below the seat of the aneurism showed areas of round cell infiltration which were situated in the neighborhood of the junction of the lateral and median lemnisci.

The motor tracts here were not degenerated, showing that the paralysis was due to some lesion lower down than the peduncle, or in the pons at the level of the aneurism, and hence not due to the pressure of the tumor, as was at first suggested.

In the medulla oblongata the right lemniscus in its posterior part was degenerated; also the fibers in the lower part of the olive. In the pyramids there was marked round-cell infiltration, and the walls of the blood vessels were thickened. This was more marked on the left side. Both pyramids were degenerated, the left diffusely and the right in its outer angle markedly so, sharply defined here and diffusely so in the remainder of the right pyramid. This was probably due to the round cell infiltration in the pyramids.

The pia of the medulla was intensely infiltrated with round cells, and the blood vessel walls were thickened.

The pia of the spinal cord was the seat of a round cell infiltration and some fresh hemorrhages.

The crossed pyramidal tracts on both sides were degenerated and this was more marked on the left side. The degeneration extended from the cervical to the lumbar regions.

The paraplegia, and the spasticity and weakness of the arms were due to the disease of the crossed pyramidal tracts resulting from foci of round cell infiltration somewhere in the lower part of the pons or in the medulla oblongata and of specific origin probably. These symptoms were independent of the aneurism, which caused no symptoms during life and was recognized for the first time at the autopsy.

Let us first discuss briefly the symptomatology of cerebral aneurisms in general with special emphasis upon the symptoms of aneurisms of the basilar artery.

It must be borne in mind that a number of the cases of cerebral aneurism present no symptoms being found accidentally at autopsy. A second group of cases present apoplectic symptoms as the first symptoms. In a third group of cases we have symptoms of apoplexy, which have been preceded by symptoms of cerebral tumor. Finally, in the fourth group of cases, there may be symptoms of cerebral tumor only.

In 555 cases collected by Beadles,³ 92 cases presented no symptoms. In about 20 per cent. of the cases, the symptoms suggested those of tumor and these preceded fatal apoplectic stroke. In over 16 per cent. of the cases the symptoms were those of a cerebral tumor, and in 46 per cent. of the cases the symptoms were those of apoplexy.

The symptoms of cerebral aneurisms in general are as follows: Headache, vertigo, vomiting, mental disturbances, loss of memory, deafness, disturbances of speech and respiration, more rarely affections of sight, convulsions, hemiplegia, paraplegia, oculo-motor palsies, still more rarely involvement of the third, fourth, and fifth, as well as the olfactory nerves. Bitemporal hemianopsia has been recorded in a few cases (Mitchell,⁴ Bramwell⁵).

As has been stated a great many cases show no symptoms at all, especially those in which the middle cerebral and basilar arteries are the seat of an aneurism.

The pressure symptoms vary according to the size, situation, and rapidity of growth.

The situation of the aneurisms has more bearing upon the symptomatology than the size of the tumor. Processes that may accompany the aneurisms, such as meningitis, hemorrhage, thrombosis and areas of softening, modify the symptoms.

Aphasia is more likely to occur in aneurism of the middle cerebral artery.

Hemiplegia occurs in aneurisms of the middle cerebral and basilar arteries, as well as the posterior cerebral artery.

It is said that paraplegia occurs only in aneurisms of the basilar artery.

Aneurisms of the posterior communicating artery cause oculo-motor palsies and pressure upon the optic tracts.

The optic and olfactory nerves may be paralyzed in aneurisms of the anterior cerebral artery. The cranial nerves are rarely implicated except the facial nerve. The involvement of the optic nerve is rare.

Mental disturbances, which occur frequently in the history of cerebral aneurisms, are probably an accidental association but may be due in part to vascular degeneration of the cerebral arteries.

Opinions differ as to the value of murmurs in the diagnosis of cerebral aneurisms. Epron⁶ considers the presence of a murmur as pathognomonic and Bruns⁷ while recognizing the value of a bruit called attention to the fact that it may be also caused by chlorosis, sinus disease and thrombosis. On the contrary Oppenheim⁸ did not believe that murmurs were to be looked upon as a safe sign and Beadles in discussing the value of murmurs claims that out of 555 cases collected there were only two in which a murmur proved to be due to an aneurism. Gowers⁹ believed the presence of murmurs to be a rare occurrence.

Let us turn now to the consideration of aneurisms of the basilar artery. Twenty-four cases were collected from the literature. Of 21 of these cases in which the sex was noted, 14 occurred in the male sex and 7 in the female sex. The age in 7 ranged between thirty and thirty-seven years, in seven between fifty and sixty-eight years, in six between sixteen and thirty years, and in one case the age was forty-two. According to Lebert¹⁰ most of the cases of cerebral aneurism occur between 40 and 60 years of age, then between 30 and 40, after which between 15 and 20 years.

No symptoms were present in some cases (Grimshaw,¹¹ Semple,¹² Greenfield¹³), or only headache (Bramwell,¹⁴ Serres,¹⁵ Hodgson,¹⁶ Durand¹⁷), or only symptoms of short duration (Oppolzer,¹⁸ Bartholow,¹⁹ Eager,²⁰ Varrentrapp,²¹ Bramwell, Durand and Fuller²²).

In this connection it is interesting to note that in 555 cases of cerebral aneurisms, collected by Beadles, 92 presented no symptoms.

Hemiplegia or paraplegia is rare in cases of basilar aneurisms, having occurred in only 7 of the 24 cases collected. The paralysis was either of long duration (Durand, Watson,²³ Russell,²⁴ Berger,²⁵ Beadles, and Van der Byl²⁶), or followed a seizure which

ended shortly in death (Gordon,²⁷ Durand, Bramwell, Eager, Oppolzer and Fuller).

Headache, or some subjective disturbances in the head occurred in nine of the twenty-four cases (Gordon, Bartholow, Bradford, Bramwell, Serres, Gull,²⁸ Hodgson, Durand and Eager).

In 18 of the cases death occurred from rupture of the aneurisms (Gordon, Bartholow, Bradford, Beadles, Grimshaw, Bramwell, Semple, Serres, Van der Byl, Gull, Durand, Blachez,²⁹ Eager, Varrentrapp, Oppolzer and Fuller).

It should be noted that of the 555 cases of cerebral aneurisms collected by Beadles, 339 ruptured.

The cranial nerves were involved rarely. Of the 24 cases collected by myself, in one there was atrophy of the optic nerves (Watson), and in one the papillæ were swollen.

In two of the cases the facial nerve was palsied (Bartholow, Loomis³⁰), and in one case the third and sixth nerves were paralyzed, due to the hemorrhage (Bartholow).

Deafness was noted only in three of the 24 cases collected. It occurred in 6 of the 31 cases collected by Lebert. The deafness is said to be due to obliteration of the artery supplying the middle ear as well as in part to pressure upon the nerve.

The size of the aneurisms of the cases collected varied from that of a pea to that of a pigeon's egg. As has already been said, the size of the aneurisms has little to do with the severity of the symptoms, as a large aneurism may cause no symptoms as my case indicates.

Basilar aneurisms occur usually according to Durand on the superior part of the artery. He quotes Lebert as saying that basilar aneurisms develop principally in front and above or posterior and beneath the artery.

A word as to the frequency of cerebral aneurisms. Gowers classified the cerebral aneurisms as follows in the order of their frequency: Sylvian, basilar, internal carotid, the artery of the corpus callosum, posterior communicating, anterior communicating, vertebral, posterior cerebral and inferior cerebellar.

Krey³² found in 142 cases of cerebral aneurisms collected from the literature that the site of the aneurism was the basilar, 42 times; middle cerebral, 38 times; the internal carotid, 23 times; the anterior cerebral, 11 times; the posterior communicating, 9 times; the posterior cerebral, 6 times; the middle meningeal, 2

times; the superior cerebellar, 2 times; the inferior cerebellar, 1 time.

In the opinion of Bradford,³³ after the middle cerebral artery the basilar artery is the most frequent seat of cerebral aneurisms. According to Nonne and Luce³⁴ aneurisms of the carotid and vertebral artery occur most frequently after which the basilar artery is the most frequent seat of aneurisms.

I think it may be concluded that there are no distinguishing features in the symptomatology of cerebral aneurisms. Beadles believed that it was impossible to make a positive diagnosis of cerebral aneurisms, except under the most unusual circumstances. Even when definite pressure symptoms are presented, there is no way of excluding the possibility of a cerebral growth. While Beadles believed that symptoms of cerebral aneurisms are characterized by intermittency occasionally, even this is rare. I believe that the paralyses which occur in cases of cerebral aneurisms which are of long duration are more frequently due to concurrent processes in the nature of foci of softening, or specific lesions such as were seen in the case reported in this paper, than to the pressure of the aneurism itself.

Pressure of tumors at the base of the brain often causes no symptoms, probably due to the fact that the brain tissue becomes displaced rather than compressed.

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A CASE OF PROGRESSIVE LENTICULAR DEGENERATION

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The similarity of certain symptoms occurring in paralysis agitans to symptoms found in the syndrome ascribed to disease of the corpus striatum is such as to suggest as a causative factor merely a difference in degree of intensity of involvement of that body. The pathological findings as far as known in both conditions, uncomplicated, are essentially those of an extrapyramidal disease.

Of the pathology of paralysis agitans there is at present great uncertainty. Dr. C. D. Camp (1) found in a series of nine case changes in the muscles. Redlich, Dana and Oppenheim have each reported changes in different spinal paths. Jelgersma (2) found bilateral degeneration of the striothalamic fibers. R. L. Thomson (3) from a study of the parathyroid glands in nine cases of paralysis agitans finds "no change in number, size, position or histological structure that would serve to distinguish them from the parathyroid glands found in individuals dying from other diseases." G. Gjestland (4) recently reported a case of paralysis agitans with enlargement of the parathyroid glands. Leriche (5) regards the disease as a result of a sensory excitation, ignored but incessant, keeping the muscles constantly on the strain and with this in view has performed the Foerster operation severing the fifth, sixth and eighth cervical roots on each side with unmistakable beneficial results. Gowers refers the tremor to a derangement of cortical centers concerned in movements that are naturally brought about by fear but offers no explanation of the characteristic rigidity found in paralysis agitans.

Our knowledge of the pathology of progressive lenticular degeneration is based chiefly upon findings of disease of that body after death. Mingazzini (6) from a study of thirteen cases

claims that the lenticular nucleus is a motor center disturbance of which is manifested by disassociated paresis and sometimes tremor. Mills and Spiller (7) from an analysis of eleven cases describe in lesions restricted to the nucleus absence of sensory symptoms and paresis of the limbs and face. Raggi (8) reports a case with complete destruction of the left lenticular nucleus in a right hemiplegia with a slow, monotonous, scanning speech but without aphasia which is not in accordance with the theories of P. Marie, Mingazzini and v. Monakow. Demang (9) reports the case of a man aged seventy-five with a right hemiplegia who later developed a progressive left hemiplegia. There was present a rhythmical tremor of the right hand and later of the left. At autopsy a bilateral degeneration of the lenticular nucleus was found. Dejerine denies that the lenticular nucleus has any connection with the motor and other portions of the cortex or that it plays a part in the control of movements in the functions of speech. S. A. Kinnier Wilson (10) in his brilliant paper was the first to ascribe a definite symptom complex to disease of the corpus striatum. From deductions drawn from a series of twelve cases, four of which were self-observed, he defines progressive lenticular degeneration as "a disease which occurs in young people, which is often familial but not congenital or hereditary; it is essentially and chiefly a disease of the extrapyramidal motor system and is characterized by involuntary movement usually of the nature of a tremor, dysarthria, dysphagia, muscular weakness, spasticity and contractures with progressive emaciation; with these may be associated emotionalism and certain symptoms of a mental nature. It is progressive and after a longer or shorter period fatal. Pathologically it is characterized predominately by bilateral degeneration of the lenticular nucleus and in addition cirrhosis of the liver is constantly found. The latter morbid condition rarely if ever giving rise to symptoms during the life of the patient." J. E. P. Swayer (11) reports the case of a male age thirty-six in whom the first symptoms of extrapyramidal disease appeared as a tremor of the right hand at the age of nineteen. At present he has constant tremor and muscular rigidity of varying intensity, dysarthria and a marked retardation of speech and movement; no true contractures or dysphagia, no evidence of cirrhosis of the liver and no familial history.

CASE. Patient is a female, born April 16, 1854, and admitted to the Kalamazoo State Hospital March 20, 1906.

Family History.—Her father, of whom little is known, is thought to have died of heart trouble. Her mother died at sixty-eight of unknown cause. The following letter from a son is all the history that can be obtained. "I don't remember the exact time the tremor (St. Vitus Dance) began but think about two days before she died. She never was paralyzed nor had any stiffness of muscles to my knowledge nor apoplexy, had some headache I don't think she vomited when she had them. She had bilious spells and at times she would be very sick and vomit. I never knew that she had any nervous trouble unless it was at the last with the St. Vitus Dance. My mother's stomach and liver troubled her for a long time. Before she died the doctors told her that she had hardening of the liver. She was also bothered with diarrhea. At her last sickness they told us she had a complication of diseases." The maternal grandmother was insane and the patient had one sister and one son temporarily deranged.

Previous History.—Her early development was uneventful. Menses were established at the usual age, were always irregular and ceased at forty-eight years of age. She had three children but was never very strong and could not care for her children as well as most mothers. She had in her early life severe headaches of the nature of a migraine; previous to the onset of the headaches she would see "black spots" and the headache usually ceased after vomiting. She always complained of "liver trouble, of the yellow color of her face and of liver spots."

History of Present Illness.—In the year 1898 the patient noticed that the big toe of her left foot was drawing up and interfered with the wearing of her shoe. During the year 1901 a tremor appeared in the left hand. At this time her arm felt stiff and she had some difficulty because of this stiffness in combing her hair. It was thought at that time that in walking she dragged the left foot somewhat and brought it a trifle more quickly to the floor. In the year 1904 she had a swelling of the lower limbs, the left being the more severe of the two. The left foot had already begun to turn in. The limbs were very tender to pressure and she complained continually of cramps in her limbs. Early in the year 1905 a tremor appeared in the right arm, later the right leg became stiff. The limbs and left arm were already somewhat contracted but she was able to walk with assistance until the year 1906. At this time the patient was so irritable and exacting that life was intolerable for those about her. The rigidity of the face and a speech defect were observed in 1906. From the onset of her illness the patient complained of abdominal pain and always held the abdominal muscles perfectly rigid. With but slight increase in the speech defect, the degree of contracture of the limbs and the bodily rigidity there has been no



Case of Progressive Lenticular Degeneration.

change in her condition since 1907. As early as 1906 retardation in originating speech and movement were noticed. In February, 1909, the patient had an attack of nausea and vomiting and at this time vomited considerable "bile." She has always been constipated and complains of intestinal cramps. She has had no headaches since the year 1909 and there is no history of alcohol, drugs or venereal infection.

Present Examination.—The patient lies either in bed or in a wheel chair in a fixed rigid attitude and can only change her position with assistance. When moved, she is carried "en bloc." The facies is smooth, stolid and mask like. The lines about the mouth are not completely obliterated and voluntary movement of the lips is possible but very slow and rigid. She occasionally breaks into a broad stiff smile which recedes very slowly. There is no difficulty in moving the eyelids. She is able to partially open the mouth but unable to move the jaw from side to side. The eyes are keen and the expression alert, contrasting markedly with the facial expression. The pupils are round, central, equal, regular, react to light direct and consensual and in accommodation. Extra-ocular movements are normal. There is no nystagmus, no contracture of the visual field. Fundus examination shows a marked central choroiditis. Her hearing is normal. Swallowing is very difficult, more so with liquid than with solid food; after much delay the patient swallowed on request. In drinking the water is held in the mouth until it can be swallowed and frequently saliva and liquid foods may be seen running out at the corners of her mouth. Contraction of the masseters is very slight. When asked to protrude the tongue she after much effort moved it to the edge of the lips and was unable to move it further. There is a pronounced to and fro tremor but no atrophy. She is able to slowly move her head from side to side but is unable to bend the neck forward or backward. The general muscular nutrition is fair but there is generalized atrophy. On palpation the muscles feel firm. There is marked hypertonicity of the muscles of the neck, trunk and limbs; most pronounced in the lower limbs. On passive, alternating flexion and extension of the forearm and arm one meets with great resistance, rapid movements being impossible. Both arms are held in adduction at the shoulders. The forearms are flexed, the left more so than the right. The right wrist is slightly flexed. The thumb of the right hand is bent under to the palm and the fingers are slightly hyper-extended. Voluntary flexion is impossible and passive flexion very slight. The left wrist is more flexed than the right. The fingers of the left hand are flexed tightly onto the palmar surface and the thumb fixed in extension. Voluntary or passive movements are impossible. The elbow contractures can be somewhat overcome by passive movements. There is contracture of the hips which cannot be reduced. The knees are contracted at

right angles but this contracture can be partially overcome. The left foot shows complete equinovarus with dorsal flexion of the first phalanx of the big toe and plantar flexion of the terminal phalanx. The left ankle is fixed. The left foot inclines to the position of equinovarus. The right ankle is partially movable. The abdominal muscles are rigid. She exhibits a constant tremor of the entire body, which is aggravated by any volitional effort and ceases during sleep. It is a true tremor of varying intensity and excursion and in the arm the most pronounced movement is from the elbow and wrist. There is at times a marked rotatory interosseous tremor of the third and fourth fingers of the right hand. When the mouth is partly open there is a rythmical up and down movement of the lower jaw. There is a constant up and down tremor of the lower limbs.

The speech is slow and there is slurring of the words. Her voice comes from deep in the throat and there is only very faint movement of the lips.

Corneal and pharyngeal reflexes are present, the umbilical reflex is not obtained. The biceps, triceps and wrist jerks are present, prompt and equal. The knee jerks and Achilles jerks are not obtained because of the contracture. There is no ankle clonus, Babinski or Oppenheim.

There are no sensory symptoms except the cramps of which she frequently complains.

During the greater part of her illness the patient has been exceedingly irritable and fault-finding but of late years has become more cheerful and frequently smiles spontaneously. She has never had any hallucinations or delusions but there is some mental deterioration and her memory is not reliable. She is fully aware of requests and responds in so far as her physical condition will permit.

The Wassermann tests, blood examination and urine analysis are negative.

The examination of the thorax is negative; of the abdomen shows pronounced dilatation of the veins about the umbilicus and the liver to be enlarged toward the umbilicus and the right iliac fossa a hand's breadth below the rib margin.

This case is of a special interest in as much as occurring as it does at the possible age of onset of paralysis agitans, it presents the comparatively rapid progress, continuous tremor, constant rigidity, true contractures, dysphagia, dysarthria, possible familial hepatic disturbance and evidence of disease of the liver found in progressive lenticular degeneration.

In all the cases reported with the exception of that of Sawyer's, cirrhosis of the liver has been observed. Kinnier

Wilson suggests that it is a primary feature of the disease and that the toxin producing the degeneration in the brain may be generated in connection with the hepatic cirrhosis. Sawyer considers the possibility of an enterogenetic toxin producing primarily the lenticular degeneration and subsequently the hepatic cirrhosis. From the history of the above case and that of her mother the hepatic disease evidently preceded the nuclear degeneration, but whether the toxin is primarily of hepatic origin or primarily of other origin the fact is evident that it has a selective action on the lenticular nucleus.

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Society Proceedings

PHILADELPHIA NEUROLOGICAL SOCIETY

DECEMBER 22, 1913

The President, DR. GEORGE E. PRICE, in the Chair

THROMBOSIS OF THE RIGHT POSTERIOR INFERIOR CEREBELLAR ARTERY CAUSING BILATERAL PARALYSIS OF THE MUSCLES OF DEGLUTITION AND ANESTHESIA LIMITED TO THE LEFT UPPER EXTREMITY, LEFT SHOULDER, AND PART OF THE DISTRIBUTION OF THE SECOND BRANCH OF THE LEFT FIFTH NERVE

By Williams B. Cadwalader, M.D.

O'Brien, male, aged 28. November 20, 1913.

A brother said that he had been told by his family physician that his father had had syphilis and in consequence the patient and his three brothers had all been treated for syphilis.

In 1907 the patient had an attack in which he suddenly became very dizzy and weak. After a few minutes he had a severe chill, which was followed by a violent disturbance of vision—"everything seemed to be moving before his eyes." Shortly afterwards, on the same day, he found that he was unable to swallow and that his left hand felt queer and cold. During the day on which these symptoms developed his own physician made an examination, but did not find any evidence of an inflammatory disease of the throat, yet he did find fever as high as 104°. After a day or two the patient felt quite well again, but was unable to swallow, and had occasional diplopia with vertigo, and noticed awkwardness in using his left hand. The patient also stated that he had often burned his left hand in handling hot objects, but that he had not suffered pain.

Physical Examination.—The patient appears healthy; his pupils are equal in size and react promptly to light and accommodation and in convergence; the palpebral fissures are equal; there is no enophthalmos on either side, and neither cornea is anesthetic. The external ocular muscles functionate normally, but on extreme lateral and upward rotation there is slight lateral and horizontal nystagmus of each eyeball. The former, however, is not greater when looking to the right than when looking to the left. Vision is normal, and the optic discs are normal. The muscles innervated by the 6th and 7th cranial nerves of either side functionate normally; diplopia is not present. Hearing is normal. Sensation of the skin, of all varieties, is normal on the right side in the distribution of the fifth nerve, and also is normal on the left side in the distribution of the first and third branches of the left fifth nerve, but in an area supplied by the second branch of the left fifth nerve there is a distinct diminution

of sensation for heat, cold, and for pain. This diminution is limited to a small area about as large as a fifty cent piece situated over the left malar bone. It does not extend as far forward as the nose nor backward as far as the ear.

Sensation of the mucous membrane of the nose is normal; sensation of the mucous membrane of the pharynx and pillars of the fauces of both sides, including the adjacent buccal mucous membrane, is lost or greatly impaired. Pin point and touch can scarcely be felt, but occasionally can be recognized. The soft palate is paralyzed. Swallowing can be performed, but with great difficulty. The vocal cords are not affected. Movements of the tongue and of the lower jaw are normal. The masseter muscles contract normally. Sensation for pin point and for heat and cold is greatly impaired on the skin of the left side of the neck; also over the whole left upper extremity and over the chest of the left side as far downward as the third interspace and posteriorly as far as the spine of the scapula. The left upper extremity is not weak; all voluntary movements are performed with as much power as with the opposite arm, but the finer movements of the hand and fingers are awkward. He cannot recognize objects placed in his left hand (profound anesthesia?).

The sense of muscular position of the fingers and of the left hand is impaired, but not lost. The biceps and triceps reflexes are equal and normal on the two sides.

Diadokokinesis is normal on either side. Station is normal; muscle power of the lower extremities is equal and normal; gait is not spastic. Tendon reflexes of the lower extremities are all exaggerated, but greater on the left side.

Ankle clonus is distinct on the left and absent on the right. Babinski sign is distinct on the left and absent on the right.

Sensation is everywhere normal except in those parts already mentioned. There is no tendency to fall or stagger to either side. There is no ataxia of the upper or lower extremities. The patient states that he feels well and frequently walks ten miles in a day.

Dr. Charles K. Mills said that this case interested him greatly when the patient appeared at his University clinic. It is difficult to refer all the symptoms present to a definite lesion. The lesion may be one of the posterior inferior cerebellar artery in which only a part of the distribution of that artery is involved. This partial closure is just what occurs in some cases of syphilitic disease of the arteries. He thought that this explanation which he believed was that of Dr. Cadwalader made the pathology of the case as clear as it could be made and yet he did not see how it accounted for the increased knee jerk on the same side, the distribution of the vessel not being such as to include supply to the pyramidal tract. Most interesting was the fact that the patient had impairment of sensibility limited to the upper limb and a part of the trunk, the lower limb and lower trunk escaping. It seemed to show, as Dr. Cadwalader said, how the strand or tract for the upper part of the body was segregated in the sensory bundle from the strand or tract for the lower part. It was also very interesting to note that only one branch of the fifth nerve was affected.

Dr. Cadwalader said he believed that Dr. Mills' and Dr. Spiller's view of this case was the correct one. This man's condition must have become modified considerably in six years' time. The patient said that in the beginning his nystagmus had been very severe, but at present it is quite mild. Dr. Cadwalader agreed with Dr. Spiller that it was remarkable that the sympathetic fibers of the eye had not been affected. The cutaneous sensation of the right side of the face is at present entirely normal, yet it is more than probable it was disturbed in the very beginning; possibly the upper part of the face on the left side was also involved at first, and it seems likely that all of these sensory disturbances had gradually disappeared, leaving only a small area limited to part of the distribution of the second branch of the left fifth nerve. At present there is no diplopia, but the patient himself insisted it had been quite marked in the beginning. However, it is not inconceivable that violent nystagmus might cause visual disturbances which could be easily confused with true diplopia.

Irritation of the plantar surface of the left foot produced a slow upward movement of the great toe with a flexion of the other toes of that foot. It was a very characteristic Babinski sign. Ankle clonus was very distinct on the left side. The left knee jerk was distinctly increased; the right knee jerk was possibly a little bit greater than normal, but not like that of the left. The Babinski sign was absent on the right. His gait was not spastic, but did suggest some stiffness of movement.

Dr. Cadwalader said that he believed he was justified in concluding that this patient had had a thrombosis of the posterior inferior cerebellar artery on the right side, even though the signs and symptoms appeared to be somewhat atypical. He said that he had no explanation to offer for the increased reflexes—ankle clonus and Babinski sign—of the left side, unless it was, as Dr. Mills and Dr. Spiller had suggested, in some way due to a disturbance in the circulation.

Dr. Mills said he had been much interested in the question of nystagmus and vertigo and their relation to cerebellar disease. He presumed Dr. Cadwalader believed that vertigo and nystagmus were due to involvement of the Deiters' nucleus.

Dr. Cadwalader answered yes.

REPORT OF A CASE OF BILATERAL DISEASE OF THE LENTICULAR NUCLEI

By George Wilson, M.D.

C. G., age 51, widower, harness maker. The patient had been a moderate user of alcohol. He contracted syphilis in early life and at present has a positive Wassermann.

His present illness dates back three years, when he had an apoplectic attack involving the left side of the body. He made a good recovery from this illness. Two years later he had a second attack which involved the right side. Since then he has been confined to the hospital either in a wheel chair or in bed.

On examination we find a fairly well nourished adult male given at times to spasmodic laughing and teeth grinding. His head and body are most of the time involved in a coarse, jerky tremor especially during voluntary movement. The pupils are equal, regular and react to light and in convergence. Ocular movements are normal—no hemianopsia or

nystagmus. The optic nerves are normal. There is slight weakness of the lower part of right face. The tongue is protruded fairly well. Chewing and swallowing are performed with great difficulty and there is a tendency to regurgitation.

The patient is almost completely anarthric. The arms and legs are spastic parietic. As soon as the extremities are moved they are thrown into a violent, jerky tremor which in greater part ceases when the patient stops voluntary effort. All four extremities can be moved within restricted limitations.

The deep reflexes are present and greatly exaggerated, plantar stimulation, however, does not give a Babinski response, neither is there an ankle clonus.

Sensation, sense of position and of passive movement and stereognosis are normal.

Occasional incontinence of feces is present.

Abdominal and thoracic viscera are apparently normal.

The case is considered one of lenticular disease because of the intense spasticity and exaggerated reflexes without Babinski response; the tremor; the anarthria and the disturbance of chewing and swallowing.

Dr. Charles K. Mills said that this patient to his mind was one of the most interesting cases now in the nervous wards of the Philadelphia General Hospital. He had studied him a number of times and could only come to one conclusion and yet it was possible that that was incorrect. It appeared to him to be a case of bilateral lenticular lesion. It is possible that the lesions may involve more than this, as for instance the anterior limb of the internal capsule, but it would appear to be likely that the posterior limb of the internal capsule is not implicated because of the absence of the Babinski response on both sides, and because of the fact that stiff and rigid as the patient is, disordered as are his reflexes, he probably has not paralysis of the pyramidal type in his extremities. The case was of interest in connection with the papers of Kinnier Wilson, Spiller and McConnell on bilateral lesions of the lentacula. With regard to the patient's anarthria his conviction was that we can have a form of anarthria from lesion or lesions of the lenticular nucleus, especially if bilateral without involvement of the capsule, although this is a disputed point.

Dr. F. X. Dercum remarked that every now and then anarthria made its appearance with a left-sided hemiplegia, though this is excessively rare. He asked Dr. Wilson whether the patient had any difficulty in swallowing.

Dr. Wilson replied that the man protruded his tongue perfectly well, but did not swallow.

Dr. Dercum said that of course made the case a very suggestive one and brought it into the same category with pseudo-bulbar palsy from double lenticular lesions. The movements, however, such as this patient presented are excessively rare. Indeed, Dr. Dercum said that he had never seen a case exactly like the case presented. Ataxia of speech was of course not at all uncommon in pseudo-bulbar palsies. Dr. Dercum thought that the word anarthria should be restricted to mean an absolute inability to emit articulate sounds as was the case originally with the patient that Dr. Dercum presented at the last meeting and that the word dysarthria should be employed for atactic speech or speech incoördination.

Dr. Mills said that he would like to say one more word and that was regarding what Dr. Dercum had said about anarthria. This man is dysarthric, but to such an extent that he is almost entirely anarthric. He

is an illustration of the very point of difference between Dejerine and Marie, Mutier and Dercum. He did not think it was the right way to put it to say that this man would be the equivalent of a motor aphasic if he could not speak at all. If a patient had slight lesions in the regions considered he would have a slight dysarthria; if he had larger lesions he would have a more marked dysarthria and so on, up to what this man has, according to the destructiveness of the lesion, a nearly complete anarthria. In each case it would be a paralytic affection of speech.

Dr. Dercum said that the interference is one of speech emission. The man whom Dr. Dercum presented at the previous meeting could grunt and give vent to other discordant sounds, but he could not for weeks articulate a single word. His knowledge of speech, however, was perfect. The symptoms of Dejerine's pure motor or subcortical motor aphasia and Marie's anarthria are the same. It was only after the man had been under treatment for a number of weeks that the man slowly and with difficulty began to articulate words, *i. e.*, the anarthria gave way to a dysarthria.

Dr. W. W. Hawke said that he had had a patient come to him a short time ago. He was sent to him as a paretic. He had unequal pupils and stammering speech. All his other symptoms were similar to this man's but to a lessened degree. A diagnosis of lenticular disease was made. He improved under treatment. The speech became gradually worse. Dr. Hawke attributed this to toxic condition; he had been using fifteen to twenty glasses of whiskey for years. The man had a negative Wassermann.

EXTENSIVE BILATERAL SUBDURAL HEMORRHAGE OVER BOTH CEREBRAL HEMISPHERES WITHOUT MOTOR PARALYSIS OR IRRITATION

By William G. Spiller, M.D.

The patient was a man aged 52 years, who came into the service of Dr. Spiller at the Philadelphia General Hospital January 13, 1913. He stated that on December 13, 1912, he, with another man, was pitching bales of paper onto a wagon; he had pitched one bale to a height of about fourteen feet and had turned his back when the bale fell and struck him on the top of the head. He estimated the weight of the bale as about one hundred and twenty pounds. He was not knocked down but he thought his neck was broken, and he was dizzy. He did not lose consciousness but was obliged to sit down because of dizziness. His neck felt stiff and he was unable to continue his work. At the time of admission, one month after the accident, he could use his upper and lower limbs in a normal manner and had no disturbance of bladder or bowels. He had been continually drowsy since the accident and had dreams at times of falling. The appetite was poor but the bowels were regular. He had vomited almost daily since the accident and had dyspnea, but had not had convulsions and had no tremor. He had used much alcohol. There was no paralysis of any part of the body, the ocular movements and the iridic reflexes were normal. The pulse was slow and full. The tendon reflexes of the upper and lower limbs could not be obtained, and there was no upward movement of the big toes in testing for the Babinski reflex. No ataxia could be detected. He complained much of headache, especially

when the head was held backward to test the iridic reflexes, and he had some photophobia.

The important features of this case were: history of a severe blow upon the head, followed by continued drowsiness, vomiting, headache and loss of tendon reflexes in an alcoholic man. There was no indication of paralysis or irritation of either motor area of the brain, and at the time the man came under Dr. Spiller's care this condition had existed one month.

An X-ray photograph of the head showed no fracture. An ophthalmoscopic examination could not be obtained immediately, but when it was obtained the report was bilateral low grade optic neuritis, more distinct on the left side. The irides reacted to light and in convergence. The man's condition when this report was received was too severe for operation. He had been unconscious for three days but moved both upper limbs voluntarily. The head could be moved passively from side to side without rigidity of the neck, but this movement caused an expression of discomfort. The pulse, temperature and respiration remained normal until two days before death.

At the necropsy the skull showed no fracture. An extensive hemorrhage covered the frontal, motor and parieto-occipital regions on each side.

Operation had been considered but the long duration of symptoms of a mild type before the patient entered the hospital, the knowledge that the man had used alcohol freely, the absence of fracture of the skull made hesitation desirable, and when the ocular report was received the stupor was so great that operation probably would have been useless.

It is hard to believe that this great subdural hemorrhage had existed four to six weeks without causing more symptoms than were present in this case; it is equally hard to believe that a moderate hemorrhage at the time of the accident was followed by a severe hemorrhage six weeks later. The absence of paralysis or convulsions is remarkable. The drowsiness, vomiting, headache and loss of tendon reflexes persisting from the time of the accident until death make the existence of hemorrhage dating from the accident probable. It is possible that some weakness of the limbs occurred just before death during the stupor.

The question of subdural hemorrhage without fracture of the skull is an extremely important one and was discussed by the writer in the *International Clinics*, Vol. IV, 1903. It has been discussed recently in an exceedingly interesting paper by Bychowski, *Zeitschrift für die gesamte Neurologie und Psychiatrie*, Vol. XIV, No. 3, 1913.

Dr. Charles W. Burr said: Some years ago a man patient of his about forty years old, was sand-bagged on the street while drunk. The assault was seen by the police, but when they reached him, they thought he was simply drunk. He was picked up and sent to his home. When Dr. Burr saw him, he showed no symptoms of any kind except profound drunkenness, from which he recovered in about forty-eight hours, and when consciousness returned he had no palsies. He had had no convulsions. For several weeks he behaved like a man recovering from a profound debauch. About three weeks after the sand-bagging he became suddenly stuporous and died within twenty-four or thirty-six hours. Necropsy showed subdural hemorrhage on both sides. The blood was fresh and Dr. Burr did not believe that the trauma had anything to do with the hemorrhage. It was remarkable that such a hemorrhage could occur and yet was not followed by any symptoms of irritation. At no time did he have convulsions

or palsies of any kind. During the patient's life Dr. Burr had no suspicion of the existence of subdural hemorrhage.

Dr. Samuel Leopold said that three or four weeks ago he saw a case at necropsy in which the picture showed a subdural hemorrhage. The clinical picture was interesting in corroborating Dr. Spiller's statements in that there were no neurological symptoms. The patient was a young boy. The father gave a history of his having fallen from an ice wagon. He got up and later lost consciousness. At the hospital they found no neurological picture at all. He was not paralyzed at all. No convulsions or Babinski. The boy went into stupor and at necropsy they found subdural hemorrhage over the cortical area. There were no convulsions.

Dr. S. D. W. Ludlum and Dr. E. P. Corson-White presented a paper on "Tests for Latent and Treated Cases of Syphilis."

Dr. Alfred Gordon inquired whether Dr. Ludlum meant to say that a negative Wassermann of both serum and cerebrospinal fluid did not exclude syphilis. An unusually interesting case from this standpoint was seen by him a few weeks ago and he saw the patient again only a few days ago. The man was referred by a physician from Atlantic City; he is 37 or 38 years old, a laborer. About a year ago he was seized suddenly with violent headaches and then he had an attack of hemiplegia which disappeared at the end of two or three days. The man remained in a confusional state which necessitated confinement to an asylum. He remained there two or three months. He left perfectly well. Three months later, the headache recurred and again another attack of hemiplegia on the opposite side. Again he was confined to the hospital and made a complete recovery. When he came under Dr. Gordon's observation there was absolutely no trace of the old hemiplegia except an exaggerated knee jerk on one side, but no other abnormal reflex, except perhaps, that stroking the sole of the left foot gave no response whatever, but a distinct flexor response on the right side. It suggested cerebral syphilis for this reason. He was mentally exceedingly sluggish. His facies was drawn. He complained of continuous headache, especially at night. At times there was difficulty in micturition. There was no other indication of paresis. Working on that assumption, Dr. Gordon had a Wassermann reaction made from both serum and cerebrospinal fluid. The result was negative. Before he gave the fluid for the Wassermann test the family physician told him that the patient had no specific treatment whatever, so that the negative Wassermann could not be explained by the previous treatment. There was, however, a slight lymphocytosis. He had about 18 or 22 cells. In spite of the negativeness of the Wassermann reaction he decided to put him on treatment according to the method of Swift and Ellis. Dr. Gordon injected the neosalvarsan into the vein and extracted the serum about an hour and a half later. The following day he punctured the spinal canal, withdrew 30 c.c. and injected as much salvarsanized serum. In twenty-four hours the patient's countenance began to clear up. He began to look around and asked questions. The headache subsided and the man gradually made an uneventful complete recovery. At the end of a week he began to be able to be about and all the symptoms, also the peculiar response to stroking of the left foot, disappeared. The question is quite puzzling. Here is a negative Wassermann of the serum and cerebrospinal fluid, and still an injection of salvarsan led the patient to a complete recovery.

A CASE OF SYPHILIS PRESENTING UNILATERAL INVOLVEMENT OF CERTAIN CRANIAL NERVES

By Arthur Gerhard, M.D., and Henry K. Dillard, M.D.

The patient was in the medical outpatient department of the Pennsylvania Hospital, and was shown by invitation. L. J., 23 years of age, male, American negro; porter by occupation; complained of pain in the face and drawing up of the left side of the mouth. He had a chancre about seven months previously; he had had pain in the elbows and heels, with no swelling, lasting six weeks. He had a sore throat four to five days before the onset of symptoms. He had had irregular headaches and had vomited twice on the day before admission. He had had frequent transitory attacks of deafness for some years. His family history was negative save that four brothers and one sister died in early infancy.

On admission his condition was as follows: pulse 88, temperature 99°, respiration 24, leucocytes 13,500, blood culture sterile, differential blood count normal, Wassermann positive. He was given neosalvarsan, .9 gm. intravenously, without subsequent reaction.

Physical Examination at Time of Admission to Dispensary.—Station not good; marked droop of right corner of mouth; unable to wrinkle right forehead and unable to whistle; paresis of external rectus of right eye; ptosis of right eyelid; marked hypesthesia of right side of face; tongue protruded markedly to left; slightly deaf in left ear; patellar reflexes present, but left slightly decreased; Achilles jerk absent on right; no plantar reflex; no Babinski; no clonus. Eye examination showed: paresis of external rectus O. D.; normal pupillary response; iris normal; low grade retinitis; a slight nystagmus.

December 3, 1913: Wassermann weakly positive. Patient improved steadily on full mixed treatment. When last seen, January 28, 1914, the various signs of paralysis had practically disappeared.

January 16, 1914; Wassermann weakly positive.

PHILADELPHIA NEUROLOGICAL SOCIETY

JANUARY 23, 1914

The President, DR. GEORGE E. PRICE, in the Chair

INTERNAL PACHYMEINGITIS IN YOUNG CHILDREN

By Alfred Gordon, M.D.

Abstract.—The hemorrhagic form of internal pachymeningitis in adults is a well-known variety. But the internal pachymeningitis without hemorrhage is the least studied. Nevertheless the latter exists. Dr. Gordon reports observations taken from the literature on the subject. He then calls attention to the same forms of pachymeningitis in young children. He mentions the work of Goepfert, Finkelstein, Jores and Laurent, Orth, and especially that of Roessle. The literature on pachymeningitis in children is very meager. Dr. Gordon reports two cases with pathological findings, one of the hemorrhagic type and the other of non hemorrhagic type. Both

cases present the same symptomatology with the exception of the retinal hemorrhages found in the first case. This case presents this peculiarity, that at no time was blood found in the cerebrospinal fluid obtained by lumbar punctures. A great many punctures have been made and the spinal fluid was free from microorganisms through the entire course of the disease in both cases. In both cases there is a slight lymphocytosis. Dr. Gordon analyzes the identical symptomatology in both cases and endeavors to find some characteristics which would enable one to make a correct diagnosis during life. He believes that this characteristic is to be found perhaps in the condition of the cerebrospinal fluid as mentioned above. If the diagnosis of pachymeningitis could be made, surgical intervention, such as Hayne's drainage of the cisterna magna, would be indicated.

Dr. Spiller said he had been interested in this subject for many years. He reported a case of hemorrhagic pachymeningitis in a child of 9 years with Dr. McCarthy in 1899. Dr. Spiller thought hemorrhagic pachymeningitis was more uncommon in a child of 9 years of age than in one 2 or 3 years of age. Syphilis must be considered a cause in such cases.

Dr. Alfred Gordon said in regard to a syphilitic condition, he mentioned that in both cases the tests were made for Wassermann and Noguchi of blood serum and cerebrospinal fluid. In both cases they were negative. It is very difficult to make a diagnosis of pachymeningitis during life, but the remarkable similarity of the clinical manifestations in both cases—also the clear condition of the cerebrospinal fluid and its complete freedom during the entire course of disease from microorganisms—made him feel that in the condition of the cerebrospinal fluid might be found some diagnostic indications. At any rate Dr. Gordon stated he put on record two cases of internal pachymeningitis in very young children, one with hemorrhage and the other without hemorrhage.

Dr. William Drayton, Jr., presented a probable case of myoclonus multiplex.

Dr. S. Leopold said that the question arose whether this case did not resemble one of Huntington's chorea or a generalized tic rather than a paramyoclonus. He remembered a case some time ago in which there was more of the contracture of the muscles. In Dr. Drayton's case the muscles themselves were thrown into spasms and the man seemed to Dr. Leopold to have more of the irregular jerking movements than are seen in tic or Huntington's chorea. Dr. Leopold had a case a year ago in which the picture resembled very much that seen in this case, only the attitude was more that of a throwing of the back very much backward and the abdomen forward, but the movements were exactly those of this man. There was some dementia present. Dr. Leopold thought that was more of a Huntington's chorea and therefore he suggested this might be a case of Huntington's chorea.

Dr. William Drayton, Jr., said that he had stated the case resembled myoclonus multiplex. There was no dementia in the man, no family history of any such trouble and the symptoms all seemed to be like those of paramyoclonus.

BILATERAL SYMMETRICAL PETECHIAL HEMORRHAGES OF
THE BRAIN AFTER NEOSALVARSAN

By Fred D. Weidman, M.D.

A white male, 41, stoker, of admitted alcoholic habits, received as the result of a positive Wassermann 0.9 gm. neosalvarsan intravenously. The prescribed technique was followed in a modern hospital. This injection was borne well. Eight days later he received a second, similar injection. The next day patient became dazed and attempted to get out of bed at night. On the second day he became irrational, spastic in lower extremities, incontinent of urine. This was followed by unconsciousness. Skin leaky, patellar reflexes exaggerated. Babinski present on the right side, no vomiting. Had two general violent convulsions. The urine showed a trace of albumen. On the third day the condition was unchanged. On the fourth day rales in both lungs. Marked retention of urine. Very little albumen. Died on the fifth day after second injection.

Autopsy findings: Lungs: Incipient broncho-pneumonia of left lung. Heart: Brown atrophy of heart succeeding hypertrophy; diffuse fibrous aortic valvulitis. Liver: Chronic passive congestion. Kidneys: Chronic passive congestion. Spleen: Miliary hemorrhages, follicular hyperplasia. Brain: Edema; multiple petechial bilateral symmetrical hemorrhages. Arteriosclerosis.

The histological examination in general confirmed the above findings. In addition, an acute nephritis of tubular and capillary type was found.

The brain merits more detailed description. It is large and slightly softer than normal. Under the pia there is a moderate excess of clear fluid. Its vessels are congested but no hemorrhages are noted. Upon incising the hemispheres, many punctate and linear hemorrhages are found in the white matter. They lie for the most part in the anterior limb and genu of the internal capsule on both sides, but a few extend into the lenticular nucleus and the corona radiata. Their microscopical appearance varies. Sometimes a central capillary is surrounded by red blood cells, or again, it may be surrounded by a ring of necrotic tissue succeeded by a zone of erythrocytes. Often the capillary may not be seen in a given section, but in others (cut serially) it will appear in the continuation of the same hemorrhage. Its position may in other cases be indicated by a clump of hyaline material. Occasionally a few leucocytes and a little fibrin will appear in the peripheries of some of the hemorrhages. Where the lesion extends into the gray matter the hyaline thrombosis of vessels is clear, and now the nearby brain tissue is necrotic,—this including the nerve cells themselves. The cortex contains no hemorrhages. The pia is edematous and contains diffuse collections of erythrocytes.

Treponemata were not discoverable in the lesions when stained by Levaditi's method. Scrapings from the linings of the cerebral arteries showed intracellular endothelial fat by Sudan III. The subject was arteriosclerotic.

The appearances lead the writer to the belief that this is a case of arsenic poisoning. The opinion that the fatality is due to released toxins of treponemata (Herxheimer's reaction) seems untenable after comparing the symptoms and post-mortem findings of known arsenical poisoning and salvarsan death (Bopoff, Kreyssig, Walkow, Heinz, and Silberman). Almqvist and Fischer believe that the combined mercury and arsenical treat-

ment occasionally find an individual with hypersusceptibility to both drugs, the combination proving fatal. Wechselmann blames insufficient kidneys, with retention of the nontoxic salvarsan and consequent biological oxidation to a more poisonous form.

References.—Cases of hemorrhagic encephalitis following salvarsan and neosalvarsan are listed below.¹

Dr. Francis X. Dercum said that he thought this paper very timely and important and that it would give us pause in regard to the present tendency to carry out "intensive" treatment of syphilis by salvarsan. In every one of the cases cited by Dr. Weidman, the injections it seems were repeated at the end of nine or ten days or two weeks. At any rate all were cases in which the intensive treatment had been pursued. Dr. Dercum said he had just come from a patient in whom the intensive treatment had been practised and in whom a profound stupor followed the last injection given two days ago. It would seem to Dr. Dercum, also, that the explanation of the corrosive action of the arsenic upon the capillaries is a very reasonable one. We should be rather cautious in the use of salvarsan and to employ it at longer intervals than we have been doing of late. Dr. Dercum said that it was not unusual to see cases in which six or seven injections had been given and at intervals of nine and ten days. We probably encroach upon the borderland of safety in using this powerful remedy so freely.

Dr. William G. Spiller said that Dr. Weidman showed him this brain some time ago and it interested him because of the symmetry of the lesions. He recalled a case of CO poisoning he had reported with Dr. McConnell. There were similar lesions in the brain. It has been shown that vessels come off from the anterior arteries and pass backward toward the lenticular nucleus and that the circulation may be delayed in these vessels when increased blood pressure occurs from any cause.

Dr. E. B. Krumbhaar asked whether the neosalvarsan was injected into the vein with distilled water, and if so, if there was any evidence of hemolysis at autopsy. His reason for asking was that in a recent investigation on the effects of intravenous injection of distilled water into dogs and rabbits, he found that 3 per cent. of the body weight would constantly produce hemoglobinuria and that much smaller amounts would produce noticeable hemoglobinemia. He asked whether there were any histological evidences of hemolysis in the lymph nodes, liver, spleen, or blood of the case reported by Dr. Weidman.

Dr. Weidman said there were no such evidences. He had searched for these points especially. Of course, the thought at once occurred to him that we might have some hemolytic microorganisms of pneumonia which might occur after the solution of the capillaries. But there was no jaundice or diffusion of color in the hemopoietic organs. In regard

¹ Salvarsan:

Assman, H. Berl. Klin. Wchnschr., 1912, XLIX, 2346-2414.

Jakob, A. Zeitschr. für die Gesamte Neurologie u. Psych., Vol. 19, Heft. 2, p. 89.

Almquist, J. Abhandlung. über Salvarsan, Ehrlich, Vol. 19, Heft. 2.

Fischer, B. Abhandlung. über Salvarsan, Ehrlich, Vol. 19, Heft. 2.

Kannengiesser. Abhandlung. über Salvarsan, Ehrlich, Vol. 19, Heft. 2.

Wechselmann, W. Urol. and Cutan. Review, St. Louis, 1913, XVII; 117; 197; 240; 298; 378.

Neosalvarsan:

Busse, O., and Merian, L. Münch. Med. Wchnschr., 1912, LIX, 2330.

to distilled water he noticed an article a year ago by Swift in which he experimented on guinea-pigs and he injected salvarsan suspended in guinea-pigs' serum and that obviated the possibility of the menstruum being contaminated; he found where he did use guinea-pig serum there did supervene these anaphylactic-like symptoms.

Dr. G. E. Price, as the president's address, read a paper entitled, "The Story of a Sixteenth Century Paranoic and His Autobiography."

CHICAGO NEUROLOGICAL SOCIETY

NOVEMBER 8, 1913

The President, DR. RALPH C. HAMILL, in the Chair

Dr. Harvey Cushing, of Boston, Mass., gave an illustrated talk on the year's experience in neurologic surgery, reporting the results in one hundred operations on the brain and spinal cord. From the results in these cases, he felt very much encouraged in these neurologic operations.

Dr. Charles Elsberg, of New York, said he had benefited by hearing the experiences of Dr. Cushing, and in discussing the paper he would limit himself to a short résumé of his own experience in intracranial and spinal surgery during the past year—a working period of a little more than nine months. During that time he had performed sixty-eight intracranial operations upon forty-eight patients, and twenty-eight spinal operations upon twenty-six patients. Of the sixty-eight intracranial operations there were four deaths, a mortality of six per cent. He was very much gratified to see that his statistics happen to be exactly those of Dr. Cushing. This may have been due to the character of the cases—he probably did not have as many cases that presented difficult problems as Dr. Cushing had. Subtemporal decompression was done twelve times, with one death, which death occurred in a patient who was operated on when in coma. We all know how difficult it is when a patient has once become comatose from an intracranial neoplasm to have him recover. In spite of a large subtemporal decompression, this patient died, and the post-mortem showed an enormous infiltrating glioma occupying almost the entire left cerebral hemisphere, having given very few symptoms before the patient finally became comatose. As a decompressive method, puncture of the corpus callosum was done eleven times. During the past two years he has been doing puncture of the corpus callosum, first suggested and recommended by Anton and von Brahmman, more and more frequently. In cases in which there is an internal hydrocephalus which contributes considerably to the symptoms, in not a few of the patients, a puncture of the corpus callosum,—making a communication between the ventricles and the subdural or subarachnoidal space,—will bring about most satisfactory palliative effects without the deformity that so often occurs with the ordinary subtemporal decompressive method. Especially in mid-brain tumors pressing upon the iter, tumors for which we often can do nothing, he has seen very satisfactory results lasting as long as nine months, with improvement not only in the general symptoms, headache, vomiting, papilledema and optic neuritis, but also in a return of the upward movement of the eyeballs. He finds himself doing puncture of the corpus callosum more and more

frequently. This method has not given him any satisfactory permanent results in one of the bugbears of intracranial affections, namely, chronic internal hydrocephalus. He would not go into the question of why this, as well as most other methods, have given few permanent results, but hoped that the patients would be referred to the surgeon earlier, before the convolutions had become atrophied from pressure.

The speaker performed craniotomy for tumor five times during the past year, and of these five patients four recovered. Four were dural endotheliomata, so-called, dural or subarachnoidal, and one was a tumor in the cerebello-pontine angle. Craniotomy, in which an irremovable tumor was found, was done five times, with three deaths, which consisted of the following. First, a patient where there was a question whether he had a tumor of the cerebellum pressing on the pons or vice versa. Only the first stage of a bilateral suboccipital craniotomy was done. The child succumbed, although she had left the operating table in perfectly good condition. Post-mortem examination showed a large tumor springing from the pons and growing into the cerebellum.

A second patient died after the exploration of the right temporal lobe, and the post-mortem showed a large infiltrating tumor in that lobe.

The third patient died shortly after the second stage of a suboccipital operation for an angle tumor. When Dr. Cushing spoke of the patient with the very large tumor, measuring seven centimeters in length, Dr. Elsberg was very strongly reminded of this patient. At the first stage he did the regular suboccipital craniotomy, bilateral, and removed not only a part of the foramen magnum, but also a part of the arch of the atlas. At the second operation he opened the dura. As soon as it was opened there was an escape of at least fifty to seventy-five c.c. of fluid from the left lateral recess, and there was respiratory difficulty. The speaker then dislocated the cerebellum to the right, very slightly, and at once came upon a very large tumor which had the character of an ordinary neuro-fibroma of the auditory nerve. Every time the tumor was touched the patient had disturbances of respiration. So it was decided to close the wound and wait until a third stage. Within an hour or an hour and a half after the operation the patient succumbed to respiratory disturbances. Post-mortem examination showed a tumor measuring seven centimeters in length and six at its greatest width, in the left cerebello-pontine angle, a neuro-fibroma arising from the auditory nerve.

Then there were two cases of abscess, one of which was fatal, and post-mortem examination showed that the abscess had ruptured into the lateral ventricle. The other patient recovered.

He has attacked the hypophysis three times during the past year by the transfrontal route, and has used a method which he has modified from the original McArthur and then the Frazier operation, minimizing the scar and making a larger opening. In one of these instances there was a tumor that could be seen by the X-ray, of which Dr. Cushing showed such beautiful pictures, and he believes that he removed the greater part of the tumor through the anterior approach without any difficulty. This was the case of a young man of eighteen. So far as injury of the frontal lobe is concerned, the first patient on whom he operated did have symptoms referable to his frontal lobe lasting for a number of days. He learned a number of lessons from the first operation, and in the other two cases had no trouble at all. The speaker believes that in selected cases there is an advantage in attacking the hypophysis by the transfrontal route; in the cases operated upon by him, the exposure was very satisfactory.

Then, there were eight intracranial operations for trigeminal neuralgia, and all of the patients recovered.

He had also operated on a number of patients and done decompressions for fracture of the skull.

During the same period there were twenty-eight spinal operations. In the first place, there were seven for tumor, and all patients recovered. Of these, five were in the cervical, one in the upper dorsal, and one in the mid-dorsal region. Then there were seven exploratory operations. In four instances there were found cystic collections of fluid, and he is beginning to believe that cysts are very much more frequent in the spinal cord than one had a reason to expect before this time.

Then there were three more instances of intramedullary tumors, and in that connection he wanted to speak especially of intramedullary spinal tumors.

There were four instances of root section; one instance of the Spiller-Martin operation for persistent pain—division of the anterior lateral tract with considerable relief. There were four operations for fracture of the spine, two for recent fractures, of which one patient succumbed and one recovered. The patient that recovered is interesting in that she had a fresh fracture. The speaker followed the suggestion of Dr. Allen, of Philadelphia, of making an incision into the cord for decompression and drainage purposes. The patient recovered, and now, after four months, is back at work. The other two operations were done for old fractures with deformity and angulation.

As all physicians know, up to comparatively recent times it was very seldom that attempts were made to remove tumors from within the substance of the spinal cord. It was claimed by some that such tumors, localized, were of rare occurrence, but it has been shown that that belief was based upon the fact that when the tumors were seen, when the patients died, they usually had burst through the cord and were no longer localized or encapsulated tumors. It has been shown within recent years that they are very much more frequent than had been supposed. Therefore, the question was, How could one attack those localized intramedullary tumors? If the tumor were exposed by an incision through the cord, and then the tumor enucleated, no matter how carefully and skilfully and delicately it was done, there was apt to be so much injury to the tissue that a transverse myelitis occurred and symptoms of a transverse lesion persisted if they had existed before, or appeared if they had not. By a method which was described by the speaker a few years ago, called the "method of extrusion," it is possible to remove these intramedullary growths with safety. This method is based on the fact that normally there must exist in every soft structure like the spinal cord a certain pressure. If a tumor grows there, that pressure is increased. If an incision is made in the location where the pressure is increased, nature must try to readjust pressure conditions, and in doing so she must push out whatever is there that is increasing the pressure. Therefore, if the surgeon makes an incision down to the growth and then waits, nature will push out the tumor slowly by pushing a few fibers away here and there. At the end of a week or so—no arbitrary period of time, of course—the tumor should lie outside of the substance of the cord, and could then be easily removed. The process would have occurred with a minimum amount of injury to the cord tissue. He has operated on fourteen intramedullary lesions. The incision is made in the posterior column of the cord, near the median line, so that if any

fibers are divided they are only those from the lowermost lumbar and sacral posterior roots.

(Dr. Elsberg then showed lantern slides on the screen from cross-sections of the cord; also pictures of cases of intramedullary tumors removed by him, one of which was a large tumor of about five centimeters in width, which gave relatively few cord symptoms, in the cervical region. In this case it is now eight or nine months since operation, and the patient is practically well.)

Dr. Ernest Sachs, of St. Louis, Missouri, said that he had no statistical report to make, but wished to say that in the state of Missouri up to the present time they have not succeeded in getting as good statistical results as they have in the east. This may be accounted for in several ways. One at least that he feels very strongly about is that up to the present time he has not been able to get hold of his cases as early as Dr. Cushing does. Dr. Cushing pointed out that in the past perhaps his results were not so good; that is, not so good as those reported this evening, and consequently the optimistic view that one gets of neurological surgery as presented by Dr. Cushing is perhaps a little too good for the present status of neurological surgery. Dr. Cushing presents his side of a case so forcibly that one wonders whether there can be any other side to the particular thing that he speaks of. He had in mind particularly Dr. Cushing's attitude in regard to pituitary tumors. He said to-night, and has said before, that he believes that palliative treatment of pituitary disease is the only thing that we could hope for. It seems to the speaker that in taking that attitude he takes the attitude that the abdominal surgeon held some years ago in reference to carcinoma of the stomach, when he did nothing more than a gastroenterostomy. Dr. Sachs has not had the amount of material that Dr. Cushing has had, and it may sound presumptuous for him to express an opinion, but it seems to him that in order to get better permanent results in pituitary disease, especially in those cases in which the process has not grown down and enlarged the sella turcica, but is growing upward into the brain substance, they should be attacked from above, as McArthur and Frazier have done, and Elsberg reports in three cases. But in order to help those cases it is necessary to perfect our methods of diagnosis in those particular types of cases. He has recently had the opportunity of seeing at autopsy two cases of tumors of the pars intermedia, tumors that had grown up and involved the basal ganglia. This had been suspected. The X-rays showed a sella turcica normal in size, and, guided by Dr. Cushing's precepts, he did a sellar decompression, but lost both cases. It seemed to him that the autopsy showed clearly that a sellar decompression in those cases was absolutely of no avail. A thing which he had not gone into with sufficient detail, but which he hoped to do in the future, was to determine whether or not these cases could not be recognized earlier, by a more careful study of the sensory changes due to involvement of the basal ganglia. The sensory examinations, as suggested by Head and Holmes about a year ago, may throw light on the earlier recognition of tumors of the pars intermedia, that grow upward and involve the thalamus or the corpus striatum.

He was interested in noting in these one hundred cases of Dr. Cushing's that one particular group of cases that has interested him for a number of years was not reported. He gathers from that either that Dr. Cushing does not consider them cases that require surgical care, or perchance—which seems unlikely—that he has not seen them, and that is a

certain type of cerebral syphilis which does not yield to "606" and the usual older specific remedies. He refers to the type of case of cerebral syphilis in which there are changes in the eye grounds, which do not yield to specific treatment. It is needless to say, of course, that the type of cerebral syphilis characterized by a gumma would come under the head of intracranial tumors, which are operable in the same way as any other intracranial tumor. He speaks of changes in the eye grounds, and does not use the expression choked disc advisedly. We all are agreed that the changes due to intracranial pressure in the eye grounds ordinarily are pressure phenomena, but the question does come up in cerebral syphilis whether the changes in the eye grounds are choked disc, that is, pressure phenomena, or whether they may be neuritic, that is, true optic neuritis. Based on a number of cases seen, he believes that these cases are choked disc and not neuritic. A case seen by him some years ago may illustrate the point perhaps somewhat better, and the necessity of operating in these cases. The woman was brought in with all the symptoms of intracranial pressure, with a strongly positive Wassermann, and symptoms referable to her temporal lobe—typical uncinat fits. There was marked contraction of the fields on both sides. There was nothing suggestive of pituitary disease. The eye grounds, besides being markedly contracted, showed a high grade of choked disc. The speaker wanted to decompress her at once, but she refused and was put on specific treatment (that was before the days of "606"), and all her symptoms—the uncinat fits and headache—all disappeared, but her fields continued to contract and her choked disc in no way improved. As her general symptoms, however, had improved, she went home satisfied. She was brought back some weeks later in the condition of acute compression, and with respiratory symptoms—sighing respirations—and the typical picture of medullary compression. A decompression at that time relieved her and the choked disc disappeared very rapidly, as it would in any tumor case. The question might be raised whether this patient did not also have an intracranial tumor as well as the specific disease, but from the subsequent course of the case, however, he thinks that may be excluded.

He has seen a number of other cases like the one just cited, and it is his belief that in those cases of cerebral syphilis in which there is a choked disc which does not promptly respond to specific treatment a decompression operation is distinctly indicated, and he thinks those cases may be very markedly benefited by such a procedure.

He wanted to take issue with Dr. Cushing on what he advocated in regard to the treatment of all basal fractures by means of decompression. Dr. Cushing's statistics show he has in the past year had four of those cases. Those of us who have seen a large traumatic service in the city hospitals have seen a great many cases of basal fracture that clear up completely, quite rapidly, without a decompression, and it is Dr. Sachs' belief that though decompression is clearly indicated in a certain number of those cases, unless there are definite symptoms usually indicating on which side the pressure is from the blood clot, it might be better to be a little more conservative in operating on these cases.

In closing, he wished to emphasize what Dr. Cushing had already said, but what he thinks cannot be said too frequently, that if we are to advance this subject of neurologic surgery more rapidly or effectively, cooperation between the neurologist and the surgeon is absolutely essential. The days are long since past, or they ought to be, when the surgeon is

merely the hands of the neurologist. They must work on an equal footing, and it seems to him that we can get ahead more rapidly in neurologic surgery by working together and not at cross-purposes. Dr. Cushing's very optimistic picture of the surgical procedures on the central nervous system should be sufficient guarantee to the neurologists that they should no longer wait and resort to surgical measures when everything else has been exhausted. It should be one of the earliest procedures rather than the last.

Dr. Albert E. Halstead, of Chicago, said that anyone presuming to follow Dr. Cushing in the discussion of neurologic surgery—that is, anyone from the west—must first feel like apologizing for his meager material. None of us can hope to have any such an experience to relate as Dr. Cushing has had.

The one branch of brain surgery in which he might compare his experience with that of Dr. Cushing is traumatic surgery. During the last year he has had records of seventeen fractures of the base of the skull, in which there was no question of diagnosis. The fracture was shown either by the X-rays or by free discharge of cerebrospinal fluid from the ears. Of these seventeen cases, nine recovered without operation—that is a little over fifty per cent. A little over two years ago he operated on a series of cases, acting on Dr. Cushing's suggestion, and did decompressions, and his experience showed him that the mortality was probably a little higher in the cases where he operated than where he did not operate. He can see no good logical reason for operating on an injured brain, where there are no localizing symptoms to direct you to the seat of injury. If choked disc is considered as evidence of increased intracranial pressure, we do not have this in head injuries, as a rule. In Dr. Halstead's work, both at the County Hospital and St. Luke's Hospital, he has had very careful examinations of the eyes made in traumatic head cases, during the last three years, and in over fifty cases carefully examined choked disc was not found, except in those cases in which a meningitis was developing. He did not mean to say that the choked disc is absolutely dependent upon an increased intracranial pressure, but it is a very strong presumptive evidence of increased intracranial pressure, and when you find it uniformly absent, as he has, he cannot see why a decompression should help the patient very much.

He believes very strongly in spinal puncture, with the withdrawal of a certain amount of cerebrospinal fluid for diagnostic purposes, and in some cases it seems to him to give relief from the symptoms for the time being, but, as a rule, he believes that the patients will recover as well without operation as with one, where a simple decompression is done.

In the other departments of brain surgery, he did not care to compare his material with that of Dr. Cushing. He has had in the last four years six hypophysis tumors, with two deaths and four recoveries, that is to say, four lived. One lived without having any improvement whatever in the symptoms. One of them has recently been operated upon only a week, and the improvement is not yet apparent. Two of his cases have done fairly well, one being cured and the other practically cured. The eye symptoms have not been relieved, however, as in his first case, which he operated on four years ago. In this case he did the transsphenoidal operation through the inferior route, employing his sublabial method. The patient is well and absolutely cured, so far as symptoms are concerned. He showed this patient at Washington three years ago, and he is still in good health.

In spinal injury he has had one case this year that was remarkable, the case of a fracture of the fourth cervical vertebra, with complete paraplegia, lasting four weeks. He saw the man the night after he was injured, and refused to operate on account of his bad condition. Four weeks later the speaker went back and operated, removing a fragment of bone that had pressed upon the cord. The patient entirely recovered in the course of six weeks.

Another case that gave him considerable satisfaction was one of paraplegia from a gunshot wound of the cord, the bullet lodging in front of the cord, at the level of the last dorsal vertebra, passing to the side of the cord and then in front of it, producing a complete paraplegia. Recovery was immediate and complete after the removal of the bullet, with the exception of a transient paresis of the flexor of the great toe.

Another spinal case that has been satisfactory was an operation for paraplegia which had lasted six months after spinal fracture. The man has not recovered completely, but so nearly so that he gets about without much difficulty.

The operations the speaker has done for decompression have not been so satisfactory as he would like. There is no disguising the fact that a decompression operation gives a considerable deformity in most cases, and, furthermore, in some cases you have cortical symptoms resulting from the brain tumor, and in a good many cases where decompression is done for choked disc it has been his experience that the improvement in the vision is not as great as he would like. That is, if the choked disc is pretty well developed, you can hope for little real improvement, but it may be that the loss of vision will not progress.

Operations on the posterior part of the brain have been in his hands rather difficult, and sometimes followed by unfortunate results. In his experience posterior operations are associated with a great deal more shock and the risks of operation are greater than in the other parts of the brain; that is, referring to the pontine angle cases and the tumors of the posterior fossa, in general. He has never been able to get through with one of these operations without having the patient in a considerable degree of shock, and he has lost several from the immediate effects of the operation. This has happened when a decompression alone was performed.

Translations

VAGOTONIA

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER AND DR. LEO HESS

OF VIENNA

TRANSLATED BY WALTER MAX KRAUS, A.B., M.D., AND
SMITH ELY JELLIFFE, M.D., Ph.D.

(Continued from p. 260)

It has already been stated that pilocarpin—an exclusively vagotropic drug—as well as adrenalin, a correspondingly exclusive sympathetic stimulating drug, have found their clinical usefulness. On account of strongly differentiated action they have suggested the occurrence of individual variation in reactivity or over reactivity. Other interpretations are also possible on the basis of the here mentioned facts, all based upon experimental observations. Should not variations in tonus, in terms of reactivity of one or the other vegetative nervous system, throw some light upon clinical observations? It was to be expected that adrenalin would be particularly active in those in whom an increased sympathetic tonus or increased reactivity of the sympathetic existed, and on the other hand it was to be expected that pilocarpin would evoke an increased reaction in those substances in which the autonomic system was in a state of increased irritability.

We have already observed that an increase of tonus in one system almost rules out an increase of tonus in the other. [Note will be taken of the exceptions to these rules found in many nervous and mental diseases in another place.] If our contention is correct, that the reactivity of individuals to pilocarpin or

adrenalin is exclusively dependant upon the tonus of the system affected, then there must be a pharmacodynamic antagonism. Individuals who are very reactive to adrenalin will be less reactive to pilocarpin, and strong pilocarpin reactions would imply reduced adrenalin reactions. Numerous investigations have proved this to be the case, and have made it very probable that there exists in man as well a pharmacological antagonism between pilocarpin and adrenalin. In this fact, based on a large mass of clinical material, we see a new stimulus for the opinion that the tonus of the visceral nervous system, or more properly speaking of its endings, must play a rôle in clinical medicine.⁵

It now becomes a question whether or not pilocarpin [or adrenalin], may produce in susceptible individuals clinical as well as pharmacological manifestations which would differentiate the two antagonistic systems. The fact that individuals who are over active to pilocarpin may be observed to have a latent condition of vagotonia in the sphere of the autonomic system which may take on the characteristics of disease symptoms, leads us to conclude that it is not improbable that an increase of tone of the autonomic system may exist not only in such localities where pilocarpin acts, but also in all parts of the autonomic system.

The levator palpebrarum also is most probably innervated by a branch of the autonomic nervous system. Its behavior under the influence of certain drugs speaks greatly in favor of the belief. Pilocarpin instilled into the eye will cause widening of the palpebral fissure. In suitable cases, a condition much like the presence of a positive v. Graefe's sign may be noticed so that we can have no hesitation in attributing this symptom to an increase of tonus in the levator muscle. In many cases of vagotonia widening of the palpebral fissure may be observed, an additional fact impelling us to believe that it is a symptom referable to increased autonomic tonus.

Moebius' sign, a condition in which the eye-balls do not converge on near fixation, seems to be due to stimulation opposite to that which would be produced by increased autonomic tone. It is difficult to explain this, but the question arises whether, since the oculomotor nerve carries autonomic fibers, it might not, in controlling the mechanism of convergence, be subject to the same variations in tone as it is in controlling other mechanisms.

⁵ Eppinger u. Hess, Zeit. f. kl. Med., 67, 5 u. 6; 68, 3, 4.

It is notable that in vagotonic individuals a mild spasm of convergence, a kind of convergent strabismus, has not infrequently been observed. Exophthalmus is to be regarded as the result of a stimulus opposed to the autonomic system, since it is caused by spasm of a muscle whose innervation is derived from the sympathetic nervous system. Finally, it may be added that epiphora was frequently observed among vagotonics.

Salivary Glands.—Salivation is the result of a state of autonomic stimulation of the salivary glands. Atropin can readily relieve this condition. Increased salivation is a not infrequent occurrence in cases of nervous people whom we have designated as vagotonics, and from the beginning of this investigation, the occurrence of increased salivation after pilocarpin was found to be typical of vagotonics. Further, when the vagus was extremely irritable, not only did salivation result from the administration of pilocarpin, but also increased secretions from the nose and eyes. In certain tabetic crises, which were plainly of autonomic type, salivation was occasionally observed. The typical vagotonic never has a dry mouth.

Skin.—Sweating after administration of pilocarpin [or physostigmin] is considered a symptom of vagotonia. A sign of increased autonomic tonus corresponding to this is the tendency to sweat of which so many people complain, and which so often assumes pathological proportions. Vagotonics, in reacting to certain stimuli, are subject to an exaggeration of the normal mild transpiration, namely, actual sweating.

Attacks of sweating are associated with many other conditions of increased tonus in other parts of the vagus, such as nausea, vomiting, asthma, angina pectoris, gastric crises and so forth. In some people only circumscribed areas of skin are involved, as the hands, feet, head, back or thorax.

Many infections are complicated at their crisis by sweating. The concomitant bradycardia adds proof to the supposition that here also there is something which stimulates the autonomics of the skin and heart [vagus]. A frequently observed symptom, for which no theoretical explanation could formerly be given, is that vagotonics have moist hands and feet, and that these extremities are usually of a livid color, which becomes dark purple in winter, and can readily be blanched by pressure. Such people usually complain of having cold hands and feet continually. This must

necessarily be regarded as a deviation from the normal distribution of blood. In many instances, a weight upon the abdomen, as for instance a sandbag, had a very beneficial effect upon this condition of the hands and feet. Of course we have to deal here with a vasomotor disturbance, but it is difficult to explain since it is just the relations of the vasodilators and vasoconstrictors to the visceral nerves, which are but little understood. However, this much may be accepted: Autonomic drugs stimulate the peripheral vasodilators in contrast to adrenalin which stimulates the peripheral vasoconstrictors. A proof of this is that pilocarpin causes reddening of the face as well as of other parts of the body.

This leads us to the consideration of another phenomenon, namely dermographism. This may be divided into two types; one the dilator type, which is characterized by reddening, swelling and even exudation, following stimulation of the skin, the other, the constrictor type, characterized by pallor of the skin where it has been irritated by a firm stroke of the finger. These observations have their exception since skin which is sweating profusely will show no signs of dermographism. Gooseflesh, which is due to a stimulation of the sympathetic supply to the *erectores pilorum*, is rarely seen among vagotonics.

In concluding the observations upon the changes seen in the skin, a few words will be said in regard to its pigment. Pigmentary changes are seen in the most varied pathological conditions, such as pregnancy, Addison's disease, Graves' disease, vitiligo, naevi and so forth. In Addison's disease, particularly, these changes are very prominent. The latest experiments concerning disturbances in post mortem pigment production in adrenalectomized dogs, and the absence of these disturbances when adrenalin has been administered, speak strongly in favor of a relation between pigmentation and autonomic stimuli [Konigstein].⁶

Frogs' skins also are controlled by the autonomic system, as the mechanism of production of pigment in them proves. When adrenalin is injected there is almost a complete disappearance of pigment. Increased production of pigment is found not only in Addison's disease, but also in a number of other nervous diseases [Graves' disease] in which the presence of increased autonomic stimulation may be assumed.

⁶ Konigstein, H., *Über postmortale Pigmentbildung*. Münch. med. Woch., 1909, No. 45.

Heart.—That type of bradycardia which changes into tachycardia under the influence of atropin must be considered as a typical manifestation of increased vagus tone.⁷ As an example of this type of bradycardia we may take that occurring in icterus due to stasis of bile in which retained salts of bile acids affect either the ventral or peripheral endings of the vagus. In young people in particular, a bradycardia is a certain sign of vagal stimulation.

H. E. Hering⁸ has stated recently that the failure of a reaction after the normal dose of .001 gr. of atropin [subcutaneous] does not signify with finality the absence of increased vagus tone, since higher doses could produce tachycardia and pressure upon the vagus nerve showed that the inhibitory nerves were irritable. We can confirm these observations and can add that in particularly obstinate cases the opposite is often to be seen, namely, the frequent action of atropin in producing not tachycardia but bradycardia.

This may perhaps be explicable by supposing that after a mild inhibition of the autonomic system by small doses of the drug there ensues a marked increase in vagus tone, causing a bradycardia.

Atropin can always obliterate the bradycardias resultant upon certain acute infections, as for instance in diphtheria, or in the convalescent stage of febrile angina, mild pneumonia, typhus, erysipelas, acute articular rheumatism, and scarlet fever. This action implies that the bradycardia is the result of increased tone in the vagus. If this reaction to atropin fails it may be assumed that organic changes exist. The type of bradycardia which is best and longest known is that accompanying increased intracranial pressure, as in cases of brain tumor, hydrocephalus, pseudo-tumor of the brain, hematoma of the dura mater, and incipient meningitis. These bradycardias are always referable to cerebral stimulation of the vagus. In these cases there is also an individual variation so that certain cases may be instances of latent vagotonia. The effects of the increase of intracranial pressure are well shown by the administration of adrenalin. After an injection of this drug which contracts peripheral vessels but has no apparent effect upon the cerebral vessels, there occurs a flow of blood to the brain followed by an increase of intracranial pressure. This stimulates

⁷ Dehio. Deut. Arch. f. kl. Med., 52, p. 97.

⁸ Hering, H. E., Münch. med. Woch., 1910, No. 37.

the vagus center, and causes a pulse characteristic of increased vagal action which may be relieved by atropin or vagotomy. Many drugs acting upon the heart can cause a bradycardia through vagal stimulation. Thus, after very small doses of digitalis its bradycardiac action may be so prominent that its entire cardiac action cannot be obtained without simultaneous administration of atropin. This bradycardia from digitalis is usually associated with other symptoms of autonomic stimulation, as for example digestive disturbances and vomiting. Similar idiosyncracies must be considered if the various results of physostigmin in paroxysmal tachycardia are to be explained. Pilocarpin can hardly be included among the stimulants of the chronotropic functions of the vagus nerve.

Vagotonics often give evidence of a great deal of cardiac activity when the precordium is inspected. Closer investigation of this heaving shows that it is not accompanied by increased cardiac action, as is necessary in valvular disease, but, as the X-ray examination shows, that there are great variations in the size of the heart in systole and diastole. This symptom is frequent in vagotonia, very frequent in the vagotonic type of Graves' disease [Basedow thymus], and in the so-called goiter heart [F. Kraus].

In vagotonic bradycardia, the stimulus acts at the sino-auricular node, but it may also act in the region between the auricle and ventricle. The result of this latter is that not every auricular contraction finds its way into the ventricle, and that the auricle beats oftener than the ventricle without any incoordination between the actions of the auricle and ventricle. The characteristic of "nervous" heart block [omitted ventricular systole of Hering] is that it may be relieved by atropin. The same result may be accomplished by adrenalin. But those bradycardias which are the result of disease of the heart muscle may be bettered by atropin through its beneficial action upon the transmission of impulses of the nodal system, and may show a slight increase of the pulse rate. Now and then, the "block" may involve but part of the nodal system, and may show transitorily those types which are demonstrated electrocardiographically when there is disease in one or another part of the nodes of Tawara.

An officer, aged 50, has complained for one year of occasional feelings of pressure in the region of the heart, with pains passing outward into the left arm. During all of these attacks, which have become more frequent of late, the patient has sweated profusely, and has vomited in some of

them as well. He has observed himself with care, and states that during the attacks his pulse goes from 88 to 50-56. The patient gave a history of lues. He does not seem old. His face is somewhat red, and he perspires readily. Blood pressure varies from 120 to 180. The second aortic sound is accentuated. The heart itself is not enlarged. Since the electrocardiographic examination of the patient interested us most, other details will be but superficially considered. During a period when the patient was in normal condition [pulse 86], the electrocardiogram was of normal character. In all the three take-offs, there was a positive R wave, and positive subsequent wave. During an attack in which he experienced the above described feelings of depression—pulse 54—the following was found: The auricular wave remained at the same distance from the R wave. The R wave, which was small before, was now three times as wide. Furthermore, it was noted that at this time the subsequent wave was negative and came directly from the R wave. With the second and third take-offs, the R wave was negative and the subsequent wave positive. This condition was observed for some length of time [one hour]. It seemed of great interest to us to note that a subcutaneous administration of .001 gram of atropin relieved the bradycardia and at the same time changed the electrocardiogram to what it was before. There was no gallop rhythm during the bradycardia.

Of course all heart diseases cannot be diagnosed in this manner even if atropin does relieve them. There are cases which owe their disturbance to auricular or ventricular extrasystoles. To what degree this condition may be correlated to the physiologic fact that the vagus is a negative inotropic nerve is hard to say.

Some physiologists deny that the vagus has an influence upon the caliber of the coronary vessels. Counterbalanced to this view is the fact that adrenalin dilates the coronary vessels not only when excised, but when in situ in the beating heart [Langendorf and O. B. Meyer]. On the other hand, one is inclined on chemical grounds to believe that the influence of the autonomic system upon the coronary vessels plays a large rôle. It is an accepted fact that the vagus can cause spasm of the coronary vessel musculature, and may thus cause narrowing of the blood vessels. According to our experience, vasodilator drugs are often of great benefit in the condition of angina pectoris. Nor do we presume too much in stating that many cases of angina pectoris, particularly of the vasomotor type, are referable to a condition of over-irritability in the autonomic nervous system. We would call attention to the good effect of vagoparalytic drugs, as well as to the fact that pilocarpin injections occasionally cause symptoms which resemble very closely the clinical picture of angina pectoris.

The cardiac vagus may be influenced reflexly as well as directly. The phenomenon longest known is that of Tschermak which is due to pressure upon the vagus nerve trunk. If one exerts pressure upon the vagus trunk in its course along the caro-

tid artery in the neck region, certain individuals will react by a marked slowing of the pulse. The variations in this affect are great in various individuals and bear a close relation to the irritability of the vagus. Indirectly the vagus may also be stimulated through the trigeminal nerve. Some of the stimuli acting upon the trigeminus may be mechanical, as pressure on its branches, or faradic stimulation, while some may be chemical, such as tobacco smoke, chloroform or ammonia. These stimuli may travel by reflex paths to the vagus nerve and may cause bradycardia. Not only may the vagus branches to the heart be affected but others as well, as for example those involved in producing nasal asthma. A type of this reaction is without doubt the phenomenon of Aschner,⁹ which consists of a bradycardia dependent upon pressure upon the eyeball. Since the eyeball is supplied by sensory branches of the trigeminus, this reaction is of the same kind as that due to stimulation of the nasal mucous membrane, which we know to be innervated by the trigeminus. Aschner's phenomenon has been found to be a most frequent occurrence in vagotonics, and, moreover, it may be readily eliminated by the administration of atropin.

Of interest in connection with the foregoing statements, are some experiments of R. H. Kahn. He was able to show electrocardiographically that adrenalin will produce changes which may be obtained to some degree by experimental stimulation of the vagus. He noted lengthening of diastole, blocking of impulse transmission, and automatic as well as weakened ventricular beats. But of greatest interest are his findings of a long series of dissociated auricular and ventricular beats. After he had been able to show that bilateral vagotomy eliminated all of these changes, he came to the conclusion that they were due to a rise in blood pressure in the brain, causing a stimulation of the vagus center. Clinically, we have observed that in some cases of vagotonia adrenalin injections produced cardiac arrhythmia without any concomitant glycosuria. These we believe to be similar manifestations to those found by Kahn in animals, after adrenalin injections. We shall go into the details of this matter at another time. At any rate it seemed exceedingly significant that these cardiac arrhythmias only occurred in those who showed some other evidence of increased autonomic irritability.

⁹ Aschner, B., *Wien. klin. Woch.*, 1908, No. 44.

(*To be continued*)

Pertiscope

Revue Neurologique

(An. XXI, No. 18)

This number is entirely devoted to the proceedings of the International Congress of Medicine in London: Abstracts of the reports presented in the Section on Neuropathology, various communications concerning neurology read in this and other sections.

1. Question—Symptoms from Cerebellar Lesions. J. BABINSKI, A. TOURNAY and M. ROTHMANN.
2. Question—Aphasia and Apraxia. DEJERINE and LIEPMANN.
3. Question—The Myopathies. OPPENHEIM and SPILLER.
4. Question—Treatment of Cerebellar Tumors. BRUNS and TOOTH.
5. Question—Parasyphilis. MOTT and NONNE.

1. *Symptoms of Lesions of the Cerebellum.*—The excess movements (Mouvements démesurés: hypermétrie) differ from ataxic movements in showing no disorientation, being more noticeable when the movement is rapid and not influenced by closing the eyes. In cases with cerebellar asynergia it may be observed that the patient is unable to walk for the reason that, although he can advance the feet, he cannot at the same time advance the trunk and is in danger of falling backward. Other tests show the same phenomena: the patient while standing is asked to bend the head and back as far back as possible. A normal person under such a test would flex the knees and so preserve a balance, the patient with cerebellar asynergia does not do so and falls backward. When the patient lying on his back on a couch is asked to perform various movements, such as drawing up the leg or touching an object about fifty centimeters above the bed with his foot, the movements at the knee and hip joints are asynergic, i. e., there is an inability to accomplish simultaneously the diverse movements which constitute an act. *Adiadochokinesia* may be present—the inability to execute rapidly successive voluntary movements, such as rapid pronation and supination of the hand. The tremor due to cerebellar lesions is of the intentional type and varies greatly in character in different cases. The handwriting is very irregular. Speech is frequently scanning or explosive. There may be marked hypotonicity of the muscles. The tendon reflexes are variable. The apparent asthenia as shown by the rapid fatiguing of these patients is probably due to the excessive efforts they make to accomplish anything. The so-called cerebellar ataxia is something quite different from ordinary ataxia and deserves another name. The phenomenon of maintaining a certain part for a long time in a fixed position is spoken of as cerebellar catalepsy. It is rarely perfect but is usually sufficiently developed to be of diagnostic value. Some lesions of the cerebellum rest entirely latent, produce no symptoms of their presence and are discovered only at necropsy. This report on the significance of the symptoms of lesions of the cerebellum by Rothmann was an effort to distinguish the symptoms of affections of the vermis from those of the lateral lobes and other parts of the cerebellum.

2. *Aphasia and Anarthria*.—Dejerine concludes that the classical teaching on aphasia of Broca and Wernicke is entirely correct. Liepmann defines apraxia as aphasias of expression. The principal forms are the ideatory, kinetic and ideomotor. The ideatory apraxia is very frequently an isolated state, the others are rarely so.

3. *Myopathies*.—Oppenheim divides the myopathies into three groups: First, the dystrophies, which comprise congenital absence of the muscles, congenital myotonia and myatonia, myasthenic paralysis, periodic paralysis of the extremities and the paralysis of osteomalacia and rickets. The second group includes myositis and polymyositis and the third group includes tetany, myoclonia and paralysis agitans. The relation between the myopathies and glands of internal secretion is recognized. Spiller divides the myopathies into two principal groups: the congenital and the acquired. The latter may be primary and not accompanied by any lesion of the nervous system, as seen in the progressive muscular dystrophy, or may be of a neuronie type in which the nerve cells of the peripheral neurone are altered, as illustrated by the muscular atrophy of the Werdnig-Hoffmann type.

4. *Treatment of Brain Tumor*.—According to Bruns the indications for radical operation depend on the nature of the tumor, the possibility of a localizing diagnosis and the facility of access. The results are not brilliant, only 3 per cent. or 4 per cent. are radically cured. Tooth says that during an operation a ventricular puncture will hinder the development of cardiac or respiratory accidents. Certain symptoms are indications for immediate operation: acute development of symptoms, rapid increase of intracranial pressure, coma, relaxation of the sphincters, convulsions, progressive paralysis or early diminution of the vision.

5. *Parasyphilis*.—Mott would include as nervous parasyphilis an acute hystero-neurasthenic state in the secondary stage, various manifestations which appear in the more advanced stage, tabes, general paralysis, and a special variety of muscular atrophy. In more than six hundred autopsies on general paralytics done at Claybury it was observed that there was very rarely any evidence of syphilis of the bones or skin. The enlarged lymphatic glands and gummata or cicatrices of gummata were extremely rare and when they were present in a case of supposed parasyphilis the autopsy demonstrated ordinarily that there were not the lesions of parasyphilis in the nervous system but of cerebral syphilis, properly speaking, such as multiple gummata, endarteritis or periarteritis or generalized gummatus meningitis. Nonne believes that in the parasyphilitic affections not only the spirochete but also its toxin produces the lesion.

(An. XXI, No. 19)

1. A Case of Acute Ascending Myelitis in the Course of Secondary Syphilis. Bacteriologic and Anatomic Study. HENRI BARTH and ANDRÉ LERI.
2. The Signs of Babinski and the Automatic Spinal Reflexes. C. PASTINE.
3. Movements of Retraction of the Lower Limbs and the Babinski Reflex. VAN WOERKOM.

1. *Acute Ascending Myelitis*.—In July the patient contracted gonorrhea and syphilis for which she received treatment. The following January she was suddenly taken with severe headache and the next day had paresthesia and weakness in the legs which progressed rapidly to a com-

plete paraplegia with retention of urine; sensation was preserved. The paralysis extended to the upper extremities and death occurred about two weeks after the onset. The spinal fluid contained an "abundance" of lymphocytes and pure cultures of a micrococcus growing in tetrads was obtained from the blood and cerebrospinal fluid. The spinal cord showed multiple hemorrhages into the gray matter and a round cell infiltration of the meninges.

2. *Babinski Reflexes and Automatic Spinal Reflex.*—Pastine maintains that, contrary to the views of P. Marie and Foix, the Babinski reflex is not a part of the general automatic spinal reflex of defense—because he has observed cases in which there was a dissociation of the one from the other.

3. *Movements of Retraction of the Lower Limbs.*—Van Woerkom does not agree with P. Marie regarding the physiologic significance of these reflexes.

(An. XXI, No. 20)

1. Minor Signs of Organic Paralysis. G. MINGAZZINI.

2. An Autopsy on a Case of Tumor of the Cerebello-pontile Angle Three Years after a Decompressive Operation. J. JUMENTIÉ.

1. *Signs of Organic Paralysis.*—The patient is asked to close both eyes tightly and the examiner endeavors to open them with one thumb above and one below the eye; there is less resistance on the affected side. For a second test the patient is asked to close his lips tightly and the examiner endeavors to separate them. With the patient standing he is asked to extend his arms in front, palms down, and hold them there. The limb on the affected side drops sooner than the other. With the patient lying on his back he is asked to elevate the legs to about an angle of forty-five degrees and hold them. The leg on the affected side falls before the other, with a series of oscillations.

2. *Tumor of the Cerebello-pontile Angle.*—Although the cerebellar symptoms lessened after the operation the one cerebellar hemisphere was found at autopsy to have been almost completely destroyed. Probably as a result of the operation the tumor did not deform the pons and close the fourth ventricle as tumors in this situation usually do. The early development and persistence of the deafness indicates the diagnostic importance of this symptom. In this case there was no hemiplegia and no hemianesthesia, an important indication that the tumor did not infiltrate the pons.

(An. XXI, No. 21)

1. A New Reflex in a Case Presenting a Cerebellar Syndrome. MARIANO R. GAŞTEX.

2. A Case of Facial Hemiatrophy with an Argyll-Robertson Sign on the Opposite Side. J. W. LANGELAAN.

3. Rapid Process for the Staining of Myelinated Fibers and Nerve Cells. A. PERELMANN.

1. *A New Reflex.*—On exciting the sole of the foot with a pin there was produced a contralateral contraction of the iliopsoas and quadriceps muscles, flexing the thigh on the pelvis. Sensation to touch, pain and temperature was abolished on the sole of the left foot and diminished on the right but the reflex was produced with the same intensity on both sides.

2. *Facial Hemiatrophy and Argyll-Robertson Pupil.*—The patient was eleven years old. There was a marked left-sided facial hemiatrophy of very gradual onset. The teeth were smaller on the affected side than on the normal. The left eye was normal. The pupil of the right eye was extremely dilated and did not react to light either directly or consensually. The reaction to convergence was preserved but was slower than in the left eye. There was a slight uncertainty in station, slight athetoid movements in the upper extremities and some nystagmoid movements in the right eyeball on lateral deviation. The author diagnoses a lesion in the central sympathetic tract situated in the gray matter of the floor of the aqueduct of Sylvius.

3. *Rapid Method of Staining Myelinated Fibers and Nerve Cells.*—Fix small pieces in 10 per cent. formalin solution for twenty-four to forty-eight hours, wash in running water several hours, dehydrate in alcohol and imbed in paraffin. Sections should be cut 6 to 10 microns thick. They are placed on well cleaned slides and after drying for twelve to twenty-four hours are passed through xylol and successive dilutions of alcohol until they arrive at distilled water, remaining there one hour. The slides are then placed in a 4 per cent. aqueous solution of bichromate of potassium and kept at a temperature of 55° to 60° for three or four days. Wash in distilled water five minutes and then stain with Kultschitzky hematoxylin for one hour at a temperature of 55° to 60°. Differentiate with freshly prepared potassium permanganate solution and decolorize as in Pal's method. Wash in distilled water one hour. Stain in hemalum twenty minutes, wash in water fifteen minutes, stain with eosin, dehydrate in alcohol and clear with carbol xylol. Mount in balsam. Myelinated fibers are colored blue, protoplasm of the cells red and the nuclei and chromophilic substance of the cells, violet.

(An. XXI, No. 22)

1. Subcortical Tumor of the Prefrontal Lobes and of the Right Inferior Parietal Lobule. C. F. ZANELLI.

1. *Subcortical Tumor of the Prefrontal Lobes.*—The chief signs present were: headache with tenderness on percussion of the head on the right side; choked disc; left hemiparesis, involving the lower distribution of the facial; torpor, with modification of character and considerable loss of memory; rotation of the head to the right; loss of deep sensibility and astereognosis on the left side. At necropsy there was found a tumor involving both frontal lobes and the knee of the corpus callosum and another one in the right inferior parietal lobule. Both were sarcoma.

(An. XXI, No. 23)

1. Functional Dysphasias. A Critical Study of Stammering. HENRY MEIGE.

2. Additional Remarks on "Some Lesser Signs of Organic Paresis." G. MINGAZZINI.

1. *Functional Dysphasias.*—Meige divides stammerers into four classes. The first are those who repeat syllables; dysphasia by repetition or polysyllabic. In the second class are those in which the repetitions are more brusque and are accompanied by clonic movements of the head and extremities; clonic dysphasia. The third class are those in which speech is hindered by a prolonged contraction; a tonic dysphasia. In the fourth

class there is an inhibition of speech, the subject resting inert and inexpressive; this verbal inertia is given the name atonic dysphasia. The motor mechanism of speech is a function of the muscles of respiration, phonation and articulation and normal speech demands perfect coördination of the muscles. Each case deserves careful study both as to the mental and physical condition present.

2. *Signs of Organic Paresis*.—Mingazzini gives Oppenheim credit for having previously observed and mentioned in his text-book (1913) the signs described by him as the "orbiculo-palpebral" and "orbiculo-labial."

(An. XXI, No. 24)

1. The Physical Structure of the Nerve Cell. LAIGNEL-LAVASTINE and JONNESCO.

2. The Localization of Cerebral Functions in the Lateral Lobes (Anatomical Verification). ANDRÉ-THOMAS and A. DURUPT.

1. *Structure of Nerve Cells*.—The method of Albrecht applied to the study of nerve cells. The nerve cell, in general, in a fresh state or conserved in a liquid, such as physiologic salt solution, presents a structure sometimes in droplets, sometimes granular. The granular condition is considered to be pathologic for it is present in cells which have been preserved for some hours and coincides with the solidification of the nucleolus and the migration of the nucleus to the periphery. The ultramicroscope shows that the major part of the primary constituents of the cells are in a colloidal state.

2. *Cerebellar Localization*.—Experimental lesions in the lateral lobes of the cerebellum in monkeys result in various abnormal attitudes in the limbs. The muscle groups (adductors, abductors, flexors, extensors, etc.) as well as the extremity affected varies with the location of the lesion. In the first animal an abducted position of the upper extremity was not corrected; this was associated with a lesion in the most external portion of the crus primum of the gyrus ansiformis. In the second animal adduction of the upper extremity was not corrected and in this animal the lesion was located in the most internal portion of the crus primum of the gyrus ansiformis. The lesions were cortical; the white matter subjacent was slightly involved but the central nuclei were intact. In a third animal the lower extremity on the right side was involved. Abduction of the limb was not corrected. This was caused by a lesion in the external border of the paramedian lobe.

C. D. CAMP (Ann Arbor, Mich.).

Journal of Mental Science

(Vol. 56, No. 235)

1. Presidential Address: Conceptions of Insanity and Their Practical Results. JOHN MACPHERSON.
2. Lunacy Administration in Scotland, with Special Reference to the Royal Asylums. A. R. WIGHART.
3. The Deviation of Complement in the Mental Disease Known as Mania. LEWIS C. BRUCE.
4. The Infection Foci in General Paralysis and Tabes Dorsalis. W. FORD ROBERTSON.

5. A Bacteriological Investigation into General Paralysis of the Insane. HENRY LIND.
6. The Wassermann Reaction in the Blood and Cerebro-Spinal Fluid and the Examination of the Cerebro-Spinal Fluid in General Paralysis and Other Forms of Insanity. WINIFRED MUIRHEAD.
7. Certain Insane Conditions Amongst the Criminal Classes. JAMES P. STURROCK.
8. Eugenics and Degeneracy. C. T. EVART.
9. The Viscosity of the Blood in Epilepsy. R. DODS BROWN.
10. A Clinical Study of Anesthesia, Mental Confusion and Moods in Epilepsy, Confusional Insanity and Hysteria. LEONARD D. H. BAUGH.
11. Treatment of Mental Excitement in Asylums. GEORGE M. ROBERTSON.

1. *Conception of Insanity*.—The author divides the subject into three great periods. In the first place, there is the period of the "volitional concept," the accounting for consequences as the result of will. During the theological period, the volitional concept exclusively prevailed under the form of demoniacal possession. Although this was the period of witchcraft, tortures, etc., yet, the writer points out, that there was a certain care for the insane which was better in a way than it was in the eighteenth or early part of nineteenth century. The second period was that of the "empirical concept," which tended to regard the preceding event as the cause of the immediately succeeding one. This concept resulted in a great improvement in methods of care and treatment, the idea being that "if the root cause of insanity were physical deterioration, it followed that its treatment lay in the direction of attempting to establish such an environment as would most effectually restore the disordered function of the body as a whole. The third period is that of the "scientific concept," which is the ideal and upon which we are entering. The writer states that the first result of this concept has been to alter our attitude towards those psychic and moral causes which were formerly accepted without question as fully accounting for the incidence of insanity. The second effect has been the gradual replacement of the belief in disease entities by the concept of "syndromes," dependent upon underlying cerebral conditions. The third effect has been to define the limits of our knowledge respecting the functions of mind and matter as they enter into the mysterious combination of human personality, and to simplify our views of the "nervous system." Throughout the address are frequent historical allusions, tracing the evolution of our present conception of insanity.

2. *Lunacy Administration in Scotland*.—An historical, critical and statistical discussion of the care of the insane in Scotland with brief description of the Royal Asylums. Credit is given Miss Dix for obtaining in 1855 the Royal Commission of Enquiry, upon whose report the present Lunacy Law of Scotland was established.

3. *Deviation of Complement in Mental Diseases*.—Using the urines of maniacal patients and control persons as antigens, the serum of a rabbit immunized to the serum of the maniacal patient as the antibody, the complement being supplied by a rabbit, the resulting reactions were quite encouraging, differentiating manic-depressive cases from "confusional states, melancholia and control persons." A number of charts and tables give the exact results. No facts are presented to establish the diagnosis in the cases under discussion.

4. *Infective Foci in General Paralysis.*—A further discussion of the etiological relation of the bacillus paralyticans, infection of the nasal mucosa and invasion of the local lymphatics, and general paralysis, a theory which seems untenable.

5. *A Bacteriological Investigation.*—Research in the Danish State Serum Institute failed to confirm the theory of the bacillus paralyticans as the etiological factor in general paralysis. The blood, cerebrospinal fluid, scrapings from the nose and nasopharynx were bacteriologically examined and in some cases the urine and scrapings from the urethra. In addition the complement-deviation test (Bordet-Gengou) was tried, cultures of the bacillus paralyticans being used as "Antigen."

6. *The Wassermann Reaction.*—The blood and cerebrospinal fluid of thirty-five cases of general paralysis and seventy-seven cases of other psychoses were examined according to the Wassermann test, proteid reaction, lymphocytosis, etc. The conclusions were not unusual, there being a positive Wassermann in a large percentage and proteid reaction in all cases of general paralysis. An increase of lymphocytes was found constantly present in general paralysis and in no other cases of insanity examined.

7. *Certain Insane Conditions.*—The author calls attention to the weak-minded or mentally defective criminal who has outbursts of excitement or destructiveness resembling insanity but due to a temper reaction. He cites several cases in detail. Such cases do not require so much corporal punishment or rigid discipline and moral training but rather mental care of some form. It is a great problem as to how to dispose of these cases, treatment with ordinary respectable insane being inadvisable, while at the first offense, association with criminal insane is also objectionable.

8. *Eugenics and Degeneracy.*—A statement of the problems of degeneracy emphasizing the tendency of the unfit to propagate more rapidly while large families are rare in the desirable classes, and showing the need of eugenics. Encouragement of the fit to have children and sterilization or segregation of the unfit are offered as real aids to the solution of these problems.

9. *Viscosity of the Blood in Epilepsy.*—The conclusion is reached after examining the blood of fifty-six cases, fifteen of which were epileptics, six healthy persons, the remainder being other psychoses, that the blood of epileptics has a higher viscosity than that of the others. This is thought to be due to some toxin present in the blood of epileptics to a far greater extent than in any other class of case examined; that it is most abundant in those suffering from frequent and severe fits; that the toxicity increases to a marked degree prior to the onset of a seizure. The technique is described in detail.

10. *Anesthesia, Mental Confusion and Moods.*—Disturbances of sensation in "confusional insanity" continue for days or weeks, but in epilepsy and hysteria, the changes may be sudden and of short duration. There may be a prodromal anesthesia in epilepsy which may disappear shortly after the fit. In serial epilepsy, prodromal anesthesia is more constant and persists for a longer time. Disorientation and other phases of mental confusion associated with anesthesia "are as typical of hysteria and many confusional insanities as they are of epilepsy." In epilepsy and hysteria anesthesia frequently appears before the mental confusion and tends to disappear before the emergence from the confused state. The same is commonly true in confusional insanities. Sometimes after sensi-

bility to painful stimuli is regained and during the period of slow mental clearing, formication and the like appear to form the bases of hallucinations. "Moods of an obsessional type" have been observed in epilepsy and hysteria, while hallucinations of the same type occur in some acute confusional cases. "The occurrence of these hallucinations appears analogous to the moods noted in epilepsy and hysteria," and are regarded (by the writer) as the equivalent of a mood.

II. *Treatment of Mental Excitement in Asylums.*—The two kinds of mental excitement: (1) that directly due to the disease, as in the case of one who suffers from acute mania, and (2) that which is a reaction to some irritation in the environment acting upon an excitable patient, require different kinds of treatment. In an acute psychosis, both kinds of excitement may be manifested. In the past, much of the excitement was mainly a reaction to harsh treatment. In the treatment of symptomatic excitement, the author advocates sedative drugs only as an extreme measure, and then for short periods under strict medical supervision. Prolonged baths at body temperature, rest in bed, improvement of general health, sleep, etc., are all valuable measures. In the treatment of the secondary excitement, the problem is largely the removal of or prevention of irritation. Noisy patients should be separated, at the onset being secluded (but not locked up), the place of seclusion being comfortably furnished and not a bare room as is so often found. Congenial occupation if it can be provided may prevent noisiness; much can be accomplished by tact on the part of the nurse in giving directions. Disturbed attacks and violent assaults on the part of male patients frequently arise from unnecessary controlling force or intemperate language by male attendants, much of which may be prevented by the presence of female nurses in the male wards. Considerable interesting discussion follows this paper, there being various opinions, especially as to the advisability of the use of sedative drugs.

W. C. SANDY (Kings Park).

New York State Hospital Bulletin

(Vol. VI, No. 1)

1. Some Preliminary Observations Concerning the Types of Psychoses Occurring in the Individual Members of the Families. MOORE.
2. The Etiology of Anxious Depressions. CHAPMAN.
3. Training Schools for Nurses in the New York State Hospitals for the Insane. CALLAHAN.
4. Quarterly Conference Minutes.
5. Appointment of Commissioner Eugen M. Strouss.

1. *Types of Psychoses Occurring in the Individual Members.*—Moore made a study of one hundred families in which more than one member had a psychosis or mental defect. All the members could not be observed. Sometimes descriptions were obtained from relatives; at other times records from the hospitals were available. In the majority of the families at least two of the cases were observed. In many families all of the cases had been observed. No attempt was made to study the quantitative hereditary factors, but the scope of the paper was limited to an inquiry into the types of psychoses which occurred together in the various families. In analyzing the facts presented, the cases under each class were consid-

ered as follows: First, those in which the psychosis occurred in more than one member of a fraternity; second, those in which it occurred in the fraternity associated with other psychoses or defects in other members of the fraternity; and, third, the facts concerning the psychoses or defects found in the ascendants of the fraternities in which the psychosis under consideration occurred.

Manic Depressive Insanity: Manic depressive insanity was found in the fraternity of twenty-two of the families considered. The occurrence of two or three cases of this psychosis in a fraternity seemed to be fairly common; it was found in eleven of the twenty-two families (50 per cent.). There were among eleven families, however, two in which some members never had a psychosis, but only a cyclothemic temperament. In addition, manic depressive insanity was found associated with epilepsy in the same fraternity in three families, and in one family it was associated with one case in which episodes of rage occurred. In two instances, manic depressive insanity was associated with paranoic states; in one of these a paranoic condition, without deterioration, the paranoic state had been preceded by short attacks of depression, and the psychosis itself showed variations in the fixedness of the delusions, and variations in mood; the other case was a chronic non-deteriorating paranoic state. It was mentioned that of the twenty-two families, sixteen had manic depressive insanity only in the fraternity, five with but one case. Considering the ascendants of the fraternities above mentioned, it was observed that in those instances, in which were found only manic depressive cases, one or more, in the fraternity, were also found preëminently manic depressive insanity only in the ascendants, namely, in nine of the sixteen families.

Other Depressions: In four instances depressions were associated with the depressions in the fraternity. In eight families it was noticeable that in four there was no history of psychosis, or defect in the ascendants; in the four others, the psychoses found in the ascendants were depressions.

Dementia Præcox: Two or three cases of dementia præcox in the fraternity seemed to be fairly common. This was found in seventeen of the forty-five fraternities, in which dementia præcox occurred (38 per cent.). In one instance as many as five cases of dementia præcox were found in one fraternity. In two additional families dementia præcox was found together with a dementia præcox-like alcoholic psychosis in the fraternity. In three other families it was found together with peculiar personalities in the fraternity. In no instance was typical manic depressive insanity found associated with dementia præcox in the fraternity. But in one family, dementia præcox and a recovered depression with hallucinations were found in the same fraternity. In two other fraternities, dementia præcox was associated with atypical depressions. In two fraternities, dementia præcox was found associated with epilepsy in the same fraternity. In considering the ascendants of those fraternities, in which dementia præcox occurred, among the twenty-nine fraternities in which dementia præcox was found alone, there were eleven families (38 per cent.), in which dementia præcox occurred in the ascendants.

Epilepsy: There were no families in which epilepsy occurred in more than one individual of the fraternity. The ascendants of those fraternities in which epilepsy occurred were therefore immediately considered. In four families, epilepsy was found without other psychoses in both the fraternity and ascendants. In one instance, epilepsy and alcoholism were found in the ascendants. In two families psychoses, but no epilepsy, were found in the ascendants.

Imbecility: Imbecility was found in more than one member in the same fraternity, in eight out of fifteen families. In one instance, five cases of imbecility were found in one fraternity. In the remaining three families, two imbeciles occurred with one case of dementia præcox. Two imbeciles were found with one case of a paranoic condition. No case of manic depressive insanity was found in the same fraternity with imbecility. Considering the ascendants of the fraternity spoken of above where only imbecility occurred in the fraternity in one family showing in the fraternity one imbecile, a paternal aunt and a paternal cousin were imbeciles. In a fraternity showing one imbecile the father and mother were illiterate, a maternal uncle and a maternal cousin, and maternal grandparents were imbeciles. In a fraternity showing two imbeciles, there was an imbecile father. In a fraternity showing four imbeciles, the father, mother, both maternal grandparents and a maternal cousin were imbeciles. In a fraternity showing five imbeciles, the father, mother, paternal grandmother, and maternal aunt were imbeciles; maternal grandparents were suspicious and eccentric. In a fraternity showing two imbeciles, the father and mother were imbeciles. In a fraternity showing five imbeciles, the mother was an imbecile, the maternal grandfather had a recovered depression, history of father unknown. In a fraternity showing one imbecile, the father was a manic depressive; the mother had a recovered depression. The material was not sufficiently comprehensive to draw more definite conclusions, and those which were offered were presented only as a preliminary statement.

2. *The Etiology of Anxious Depressions.*—In this paper the author presented a study of the etiological factors in eighteen cases of anxious depressions—all women. These cases did not represent any definite clinical group, but were chosen only on account of the presence of anxiety, as a most prominent symptom in each case. The factors which have to be considered in the study of the etiology of psychoses are: first, those which have to do with the makeup of the individual, in which we have to include both heredity and the personal peculiarities; second, the precipitating factors. In this series of eighteen cases, six cases had an entirely negative family history; nine cases presented family heredity in the immediate family, either grandparents, parents, sister or brother being affected. Hoch has shown that in the affective psychoses we find in a certain proportion of cases exaggerated emotional traits, more or less throughout life, and that there exists a marked tendency of the psychosis to proceed in harmony with these personal peculiarities. Eight of the eighteen cases were constitutionally inclined to be overquiet, depressed, or to worry. Two of these were subject to mood deviations; seven of the eighteen cases were described as normal, quiet or somewhat reserved. Of the remaining three, one was said to have been normal, but gradually shut herself away from her environment; one was self-centered and reserved, and the third was high-tempered and wanted her own way.

Seven cases had former attacks.

In considering precipitating causes, the part played by the menopause was considered. In seven cases, the menopause was coincident with the development of the anxious state. In three cases it had passed before the onset of the psychosis. In eight cases, the psychosis developed before the onset of the menopause. There was no case in which the development of the menopause could be said to be the only factor. Among actual physical causes, very little was found. In marked contrast with a scarcity

of physical causes, a prominence of mental causes was found. Bereavements played an important part. It seemed that the adaptation required when some important interest was taken out of the patient's life, when, so to speak, that upon which the patient lived was removed, was found to be impossible in these cases. This was the factor in nine cases.

In eight cases, sexual causes were at work. Two cases, widows, who broke down after disappointment in their hopes for re-marriage. In another case, two attacks came on after childbirth, but they might have been dependent on the fact that childbirth coincided with the resumption of coitus interruptus, after normal intercourse had been practised during both pregnancies. Another case developed her depression after years of illicit intercourse with a married man had been discontinued. Another case experienced sexual excitement due to gynecological treatment; she continued self-tamponage for a year and one-half daily in spite of the fact that a physician had discharged her as cured, and told her she needed no treatment. She developed neurasthenic symptoms, with depression, and when her husband made her stop her self-tamponage, a more marked anxious depression developed.

A single woman who had struggled hard with her sexual desire for years, and compensated for it by many religious practises, which had a decided erotic coloring, broke down at the menopause and after her brother's death. There were also two cases in which no definite causes could be made out, but one of them had practically stopped sexual intercourse with her husband twenty-two years before, and during this period had five attacks of anxious depression. A vast majority of the cases had not had sexual satisfaction for years. In connection with the more plainly sexual etiology evidence of sexual excitement was actually seen in a considerable number of cases. One case had orgasms while urinating; another spoke of her increased sexual desire; the third masturbated openly; the fourth exposed herself; a fifth spoke of sensations of orgasm. Sexual sensations were present in a number of cases. Ideas of sexual assault were present a number of times; sexual accusations were noted. It was seen in the cases that the sexual factor played an unquestionable rôle, either in the nature of a definite sexual etiology, or in the nature of evidences of sexual excitement in the psychosis. There was also of importance in the etiology bereavement of any sort, the removal of an interest on which the individual lives plays in the production of the psychosis. Undoubtedly, there was often a sexual element in this as well. There were not enough facts to understand fully the mechanisms by which anxiety was produced in these cases. The author agrees with Jones that anxiety is an inherited instinct of protection against external dangers; therefore, a reaction to external situations, and that this reaction is seen in pathological states in the sense that here anxiety also represents a protective reaction but against internal dangers, that is, against sexual wishes that are not in harmony with the main tendencies of personality.

LEAHY (Ward's Island).

Book Reviews

MODERN PROBLEMS IN PSYCHIATRY. By Ernesto Lugaro, Professor of Psychiatry in the University of Modena. Translated by David Orr, M.D., and R. G. Rowe, M.D. Manchester University Press, Manchester. \$2.50 net. Longmans, Green & Co., New York.

The dominating note of this book is that of suggestiveness along the line of the problems that await the student and the investigator in this comparatively new branch of medicine, this of psychiatry. The problems are reviewed separately in the several chapters as they must present themselves, each from its own point of view, to the consideration of the psychiatrist; the knowledge already gained is briefly and clearly stated so as to form a definite basis for further work in the acquisition of data, as yet so meager, and in a fuller understanding of the entire subject. The working hypotheses are clearly and frankly offered, yet with a reserve that awaits and invites further verification or alteration as knowledge increases. The author is not content with a restricted application to any one phase of the subject, but insists upon the interdependence of the separate problems upon each other and of psychiatry itself upon the sciences of biology, anatomy, physiology and psychology, without whose aid advance in psychiatry would be impossible.

Still with all Dr. Lugaro's comprehensive conception of his subject in its varied aspects, there is a strong tendency throughout to refer the subjective too much to the objective and to measure mental phenomena, normal and pathological, entirely in objective terms; to magnify too exclusively the objective morbid cause for all mental disease. He does right to decry the preëminence given to psychic causes in the vague, general sense that finds overactivity of the mental faculties and overstress of the emotions sole causes of the insanities. But why go to the other extreme and find in physico-chemical agencies the only determinants of mental disease? He does not entirely rule out the psychic element but makes these disturbances but secondary following on the primary objective cause. No small problem exists for psychiatrists to determine how far physico-chemical agents incite and assist psychical causes and how far on the other hand the morbid action of these agents is aroused and influenced by the latter. A definite and complex physico-chemical action upon the nervous organism cannot be denied, but had Dr. Lugaro recognized what psychoanalysis has gained and proved by its recognition of the unconscious and investigation into its activities he would have means for better understanding the interaction of the two sets of causes.

The fact that this is a second edition of the English translation of a work that appeared in the original eight years ago would explain the limitation of the author's position at that time. It would, however, have seemed fitting that a psychiatrist who viewed his subject so broadly and carefully, honestly seeking the truth, should have incorporated later a recognition of this valuable theory. With some comprehension of psychoanalysis the chapter on Psychological Problems would hardly have con-

cerned itself so fully with the discussion of the "psycho-physical parallelism" which forms the mechanical determinism of states of consciousness. This necessitates a long discussion of the relation of the external world and consciousness which leads to a material realism, toward which the whole book seriously tends. As for the unconscious, its existence is simply denied. Latent records exist only in a physical imprint.

Of definite and practical value, however, is the chapter Anatomical Problems, wherein is explained with striking simplicity and clearness the histological structure of the nervous organism and the functioning of these nerve cells in normal processes; the structures of the cortical areas and their interrelation through the association function with the effects upon these nerve cells and areas of the action of exogenous and endogenous disturbing agents.

There follow three chapters on Problems in Pathogenesis, Etiological Problems and Nosological Problems respectively. The first of these takes up the connection between anatomical and functional alterations of the nervous organism, as well as of other organisms, and mental pathological phenomena. In this chapter the morbid causes are discussed in their method of action while in the next, Etiological Problems, the causes themselves are traced with careful detail. Anomalies and predispositions are defined and explained as diseases "in the widest sense of the term," caused by the action of morbid conditions upon the progenitors rather than the individual. Degeneration is defined as a disease of the stock and not an hereditary, acquired character. Dr. Lugaro makes of the heredity of acquired characters a compromise theory by which only characters which are advantageous to the organism can become hereditary from the very nature of heredity which is itself an acquired, adaptive product of evolution—a compromise which as Dr. Clouston has said in the Foreword to this volume will hardly satisfy either those who deny or those who admit hereditary transmission of acquired characters.

The varying relations between causes and symptoms are brought to attention under Nosological Problems and various specific diseases and groups of diseases are considered with special reference to their symptoms and syndromes as related to the problems already discussed. One is impressed again in these chapters with the insistence upon the physico-chemical or objective cause as of ultimate importance and the relegation of the psychic to a secondary and unimportant place. The author is confronted by the "protean symptomatology" of hysteria—a disease in which he thinks psychology can only "furnish formulæ for explaining the symptoms in general terms,"—by the delusions and "fixed ideas," many of which he enumerates, and though he admits the affective theory as the basis of these prolific symptoms, failing in a comprehension of them and reducing all too arbitrarily to the objective cause, he fails in explaining them and in finding a practical, efficient method of dealing with them.

The last chapter, devoted to Practical Problems, treats of the methods of caring for the mentally sick, removal of causes of diseases, alleviation of symptoms, removal of secondary exciting causes, prevention of injury to the patients themselves and to society. Conditions demanding improvement both in care of the diseased and in prophylactic measures are largely those of Italy but there is much that we may all take to heart until we have outgrown that attitude of censure and harshness that treats the mentally sick as morally reprehensible rather than the victims of disease.

The prophylactic measures suggested are as well of universal, practical value. The chapter is written in a spirit of high and practical altruism.

The book is indeed one of interest and value and has been made available to English readers through a sympathetic translation marked by that simplicity and directness of style which are evidently the author's own. In spite of its materialistic limitation we must recognize that open-mindedness and suggestiveness which invite and stimulate further research and further enlightenment. Only it must be admitted that the point of view must needs be altered to give to the psychical its place and value in order that there shall be a more complete understanding of the problems of psychiatry and a more effectual application of this science to the cure and prevention of mental disease.

L. BRINK.

DEVELOPMENT OF RELIGION AND THOUGHT IN ANCIENT EGYPT. By James Henry Breasted, Ph.D., Professor of Egyptology and Oriental History in the University of Chicago. Charles Scribner's Sons, New York.

It is a task demanding no small working knowledge of the sources of ancient Egyptian literature to gather into the ten lectures composing this compact volume all that the author has here brought together to show the development of religion and thought in ancient Egypt. His material is gathered first of all from the Pyramid Texts, the documents found in those most ancient, existing tombs of the Egyptian kings; from the later Coffin Texts, which were written in the transition period before the better known papyri called the Book of the Dead were placed in the tombs of the people generally; and from this so-called Book of the Dead and certain other miscellaneous sources. These are all necessarily fragmentary and incomplete from the ravages of time, and moreover written originally without a sense of correlating and arranging the varied contents or harmonizing the often conflicting beliefs which were inserted by careless hands. Yet the author has discovered in these sources a clear development of thought, particularly of religious thought, during the thousands of years these records cover, and has constructed a logical, clear account of this development.

The material attitude toward death and the hereafter exists not only in the earlier years, when, as the author strikingly puts it, the massive pyramids were built to defy by their very titanic greatness of size and structure the power of death, but it persists, though in lessened form, throughout the history of ancient Egypt. Still, even with this persistence of the material conception of the state of the dead in the hereafter and of the means employed to ensure to them comfort and well-being, there is a gradual, higher development of the life beyond, as well as a growth and unfolding of a moral consciousness and a sense of righteousness or justice as a condition for happiness and the favor of the gods there and approval and prosperity here; a development sufficient to incite wonder and admiration, appearing as it does in a people standing thus alone in the dawn of history. Slowly this growth of religious thought manifests itself through the course of these many changing centuries, first in this lessening of faith in the efficacy of purely material and physical means used against the power of death; then in the popularization of mortuary

beliefs and customs to extend them beyond the narrow limits of exclusively royal use and benefit; in the arising and growth of a moral consciousness; until in the late centuries there arises a king who establishes a world-embracing monotheism based on ideas and temporarily overthrows the polytheistic materialism and ceremonial that filled the land. Though as his personality passed with this king there arose at once a violent reaction that restored the deposed deities, the world idea remained to some extent, as certain hymns of worship indicate, and there remained also in men's minds a new sense of personal relationship with God. But the nation had not yet outgrown its materialism and its polytheism and could not be forced suddenly into a monotheistic idealism. It drifted now into a period of moral decadence and an enslaving sacerdotalism, which had received new power by the restoration of the priesthood for a time overthrown by the advocate of monotheism.

Such is the development which the author traces, a course that reflects and in fact results from the gradual transformations and changes in the political life of the nation. With the presentation of this the theme of the book, the imagination of the author has given also, reconstructed from the records of these centuries, coherent pictures of the popular and social life of the people and of the mortuary ceremonials which occupied so great a portion of their lives, which add to the interest and effectiveness of the book.

In the study of the broad, general advance of the onward movement Professor Breasted has not made any attempt at an exhaustive study of the many deities but notes the effect of succeeding changes in thought upon the conception of them, especially in the idea of the sun-god Re, whom he makes the chief god of the nation. While acknowledging and dwelling at length upon the wide and irresistible popularity of the religion of Osiris, still he maintains that Re had always held first place and that Osiris was but a later deity whose religion was as it were affixed to the already powerful sway of the sun-god, even finding Osiris in the earliest mention of him in the Pyramid Texts as an enemy to be guarded against. Whether his deductions from the various sources are correct or whether the contention of those who make Osiris the first god of Egypt in ascendancy over all others or identification with them, source of life and fertility on earth, lord of the celestial as well as the nether world of the dead, god of righteousness here and hereafter, in most of which conceptions according to Professor Breasted Re occupies the ancient and unaltered first place, is too obscure and too large a question for discussion here.

But in the interest of psychoanalysis one misses an inner penetration into the deepest cause of things, where one finds the beginnings of the god ideas and the meaning of the phases of religious thought development.

Reference is frequently made to the growth of religious thought and of the advancing conceptions of deity as from within, the reflection and outcome of the development of the nation itself, but the inevitable, instinctive demand which creates all these forms of thought and faith is not fairly met. It is as if this great national progress were set before us, a magnificent spectacle for our admiration, as it truly is; but as a great upward reaching whose beginnings are discernible in the depths of the psychical life, it is not thus presented. Perhaps a deeper insight into these sources might give a clearer understanding as to the various god faiths and serve to unify apparently conflicting manifestations of religious be-

lief. There seems even a studied avoidance and ignoring of certain details of belief and ceremonial, due no doubt to lack of recognition of their deeper meaning and interpretation; details so numerous among the ancient Egyptians as among other early peoples, which represent in striking form though crudely the early attempted sublimated expression of instinctive factors. There is scarcely room for this in a volume of this size devoted necessarily to the broader general results of psychic activity, but a deeper penetration would have illuminatingly interpreted for the author and his readers the general scheme so well amplified and presented.

L. BRINK.

T. G. SELLEW

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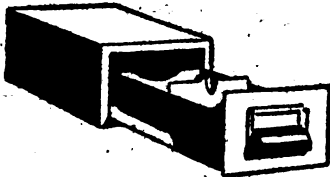
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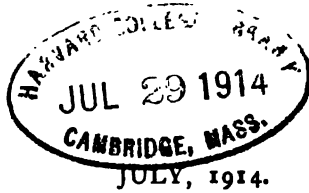
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Original Articles

PARAMYOCLONUS MULTIPLEX, INCLUDING A CASE WITH NECROPSY SHOWING LYMPHOCYTIC INFILTRATION OF THE PIA¹

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So few cases of paramyoclonus multiplex with necropsies have been reported and of these only one with lymphocytic infiltration that I thought another of this type would be worth recording. In addition to the necropsy findings, some of the clinical features were unusual, such as the involvement of the face and the tongue, the increase of the movements during voluntary efforts and the peculiar affection of the speech. For the history and material of this case I am indebted to Dr. W. G. Spiller. The others are selected from the dispensary service of the University of Pennsylvania, the East Oklahoma Hospital for the Insane and my private work.

Paramyoclonus multiplex was described by Friedreich in 1881 as a symptom complex in which occurred quick, jerky contractions of the muscles. The distribution of the contractions was

¹ Read at the fortieth annual meeting of the American Neurological Association at Albany, N. Y., May 7, 8 and 9, 1914. From the Department of Neurology and the Laboratory of Neuropathology of the University of Pennsylvania and the East Oklahoma Hospital for the Insane.

generally symmetrical and included principally the trunkal muscles and those least under voluntary control. The movements were confined to bundles of fibers or individual muscles, resembling fibrillary or fascicular twitchings, or causing a bulging of the entire muscle and occurring at the rate of thirty to one hundred and twenty per minute. The joints and limbs were, as a rule, not moved by these jerkings, or, if so, only slightly. The muscles of the face were not usually affected, the platysma, however, was one of those most frequently involved. The contractions ceased when the attention was directed to them, due to the psychic control, but became worse when the mind was diverted, as when the patient would lie down and think of something else. Marie, Bechterew and Stadler referred to the importance of this. The symptoms disappeared entirely during sleep. In one of my cases, however, the attacks always came on when the patient appeared to be sleeping profoundly.

Since the appearance of Friedreich's original article numbers of cases have been described under this name. Owing, however, to the great similarity in the character of the movements occurring in other more or less allied conditions the definite understanding of paramyoclonus as a clinical entity is rather obscure.

The cases conforming to Friedreich's original description, where some psychic disturbance is the evident exciting cause, often border so closely upon hysteria that it is difficult to see why they should not be considered as myoclonic or myoclonoid manifestations of hysteria rather than as paramyoclonus multiplex.

Lukacs, Verzar, Sizaret, Bernard and a number of others recognized the importance of trauma and mental shock in the origin of the disease and in Friedreich's case a fright preceded the onset of the affection.

Strümpell, Houchard and Fleisinger regard paramyoclonus multiplex as identical with hysteria, while Hoffmann and Boettinger refer to its close relationship to, or identity with, chronic chorea.

Farge, Heilig and Mettler believe most cases to be only symptomatic or transitional.

Unverricht has considered quite exhaustively a familiar form of myoclonia occurring with epilepsy in the degenerative type of neuroses. Lunborg, Bühner, Garnier, Verco, Putnam, Mott and others have also recorded cases of this character. In these reports

motor symptoms were the same as in the functional type of paramyoclonus, with the addition of true epileptic seizures.

In these epileptic forms, according to Unverricht, the tongue and throat are most frequently involved, whereas affection of the face from the onset of the disease, in Heilig's opinion, indicates a form of hysteria, tic, or chorea.

Reynold reports the occurrence of myoclonic movements between the true epileptic seizures in about 75 per cent. of all epileptics. Ballet, Bruns, Hoffmann, Reynolds and others also refer to the presence of these interparoxysmal myoclonias. Such patients for a long period may have the true epileptic seizures only during the night when they are not observed. The question of making a definite diagnosis and prognosis in some of these doubtful cases is both a serious and a difficult one. One might suppose himself to be dealing with a purely functional condition and later have the patient develop an active and unmistakable epilepsy. Instances of this kind have been reported (Turner) and such a transition was shown in one of my cases. To make the problem more difficult hysteria doubtless occurs in conjunction with both the functional and the epileptic forms. Ziehen, Venturi, Marina De Concilius and Carriere mention this relation and it was found in case five of this paper. I have found these combined forms wrongly called hysterio-epilepsy, a term so often misused by the general profession.

From the histories of seven hundred and five epileptics in the dispensary of the University of Pennsylvania, many of whom I questioned particularly about the possible occurrence of interparoxysmal movements, and from the study of eighty-nine epileptics, whom I observed for a number of months at the East Oklahoma Hospital for the Insane, I have been unable to confirm Reynolds' view. Myoclonic movements were present between the epileptic seizures in only three of the dispensary cases and in three of the patients at the hospital. The histories of these patients are of interest and are given in a brief way, no mention being made of tendon reflexes, Babinski signs, etc., where they were normal.

Shanahan mentions the occurrence of paramyoclonus in only 7 of the 2,150 cases of epilepsy he observed and Alden Turner refers to only 2 cases among the 2,000 epileptics reported in his work. Singularly in both of these the paramyoclonus antedated by several years the genuine epileptic seizures.

Soury believes paramyoclonus multiplex to be similar to cata-

lepsy and the hypnotic state, in that the psychic control is gone and the muscles, instead of retaining their normal responsive power and position, react to stimuli by irregular, jerky and incoordinated movements.

As already mentioned, paramyoclonus occurs symptomatically with, or following various disorders and is so reported by many writers. Indeed, I do not see that even the clearest cases deserve recording as true clinical entities, but believe the attacks should be considered as myoclonic, or myoclonoid manifestations of hysteria, epilepsy, or whatever the underlying disease might be. Frequently the resemblance to the tics and choreas is so close that the attacks might be forms of these affections.

Paramyoclonic movements have been observed following diphtheria (Remak) and other infectious diseases (Raymond, Valobra, Sterling, Meynier). As a complication of lead poisoning Leubuscher mentions them and Starr, Carriere, Bertrand and many others report them following trauma. They also occur in paresis (Grawitz) and in a case of paresis at the East Oklahoma Hospital for the Insane, muscular twitchings occurring at the rate of about 100-120 per minute were present for a period of two days. They included the facial muscles on one side (eyelid, forehead, mouth) in such a way as to give the expression of unilateral laughing. These intermittent twitchings were accompanied for an hour or so at a time with peculiar spasmodic grunting sounds resembling low laughter. These apparently emotional outbreaks would last one or two, sometimes five, seconds and would again occur after an interval of about a half minute.

Clark described myoclonic movements in meningitis and encephalitis and I have seen them in a case of encephalitis following influenza.²

Stadler refers to the resemblance to Thomsen's disease. Friedrich believed the condition was due to irritation of the anterior horn cells. Tutschaninow had a similar view and seemed to verify it by experimentally producing spasms in dogs with spinal injections of carboic acid.

Popow claimed a myopathic origin while Homer and Vaulair believe the cause to be a hypersensitiveness of the receptor cells of the cord. A very interesting case reported by Strasman with the changes in the receptor side of the cord typical of tabes, such as

² In discussing one of the papers at this meeting Dr. Pierce Bailey referred to a case of paramyoclonus occurring with anterior poliomyelitis.

lost tendon reflexes, diminished sensation, etc., contradicts this view of Homer and Vaulair.

Lunborg thought intestinal intoxication very important as a provocative cause in the epileptic forms.

Necropsies have only added to the obscurity of the etiology of paramyoclonus. Cortical irritation was found as a cause, particularly where the attacks were of an intermittent or symptomatic type (Patella, Pairo, Pic and others). Hypertrophy of the muscles was found by Hunt, whereas Stadler reports muscular atrophy in two cases.

CASE I. R. C. Colored laborer, age 62. Admitted to the Philadelphia General Hospital in March, 1909, complaining of "Nervousness and shaking all over the body."

The family history was negative. Patient used alcohol moderately, but used a great deal of tobacco.

Examination.—Well-nourished man, apparently about sixty-five years old. No scars on his body. Skin dry, harsh, and scaly. Nearly every muscle of his body showed coarse tremors or twitchings and his voice was tremulous and stuttering, making it very difficult to understand him.

His gait was very slow; he took very slow, shuffling steps, raising his feet only slightly from the floor. Attempts to turn quickly caused ataxia and a marked coarse tremor of the legs and arms. On standing he swayed slightly. This was not increased by closing his eyes.

Every attempt on the patient's part to move voluntarily any part of the body provoked a coarse tremor. Thus, wrinkling the forehead caused trembling of the eyelids and occipito-frontalis and with the attempts to draw up either corner of the mouth there were tremors of the cheek, mouth and neck muscles. The moment the patient relaxed the tremors ceased. The tongue was large, flabby and coated, possibly very slightly atrophied on the left side and a very violent coarse tremor was noted when the tongue was protruded, freely movable in all directions. With the exception of the above motor disturbances, the cranial nerves were normal. Posterior cervical glands were not enlarged. Irides reacted normally to light and accommodation and pupils were round and equal.

The musculature of the arms was fair, no atrophy nor spasticity; active and passive movements normal as to power and resistance, etc. Biceps and triceps reflexes prompt and exaggerated on either side and equally so.

Deformity of left wrist from an old fracture. Grip weak on that side; stronger on the right, but weaker than it should be.

Upon voluntary efforts the muscles of the hands and arms developed coarse tremors, subsiding in a few moments after the

discontinuance of the exertion. When at rest and supported there were no tremors. There were, however, constant fibrillary twitchings of the right biceps during the observation, increasing and decreasing at times. Fibrillary twitchings of a finer type were also noticed in the upper part of the left pectoralis major.

Hands extended showed coarse tremor, more intense on the right.

The muscles of the legs were weak, not atrophied nor spastic. Could perform all movements. Achilles and patella tendon reflexes normal. No clonus. No Babinski. Sensation tested for heat, cold, pain and touch, was found to be normal. Bladder and rectum not affected. Attempts to sit up caused a coarse tremor of the entire body.

Finger to nose and finger to finger tests showed slight ataxia. The ataxia was much greater in the legs largely due probably to the greater comparative weakness.

Mental power was fair. The speech was stuttering, tremulous and very jerky. The lips and tongue trembled when the patient tried to talk to such an extent as to make it almost impossible to understand him.

Patient contracted pneumonia and died three weeks after admission.

The brain and cord were removed at the necropsy and later sections were taken from the usual areas of each. As the findings did not show any difference except in intensity in the portions examined, only several representative areas will be included and they are as follows: left paracentral convolution, the pons, the cervical, the thoracic and the lumbar segments of the spinal cord.

Paracentral Convolution.—The meninges were infiltrated with round cells, extending into the cortex as an intense perivascular infiltration. Plasma cells were present, but not very numerous. The vessels were congested. Numerous small vacuoles were found throughout the sections, but they were not perivascular and may have been artifacts or due to bacilli (?). Under high magnification and careful focusing there appeared to be a groundwork of lightly staining tissue at a different plane from the remaining portion of the section, so that these cavities may have been simply due to some unusual contracted condition occurring in portions of the section more thinly cut than others, either due to a poor knife, or due to cutting over a space occupied by a shrunken ganglion cell, or one destroyed by neuronophagocytosis.

The cells stained poorly and many of the nuclei were absent or not centrally placed. Neuronophagocytosis could be found in various stages. The glial cells were somewhat increased.

Pons.—The meninges were infiltrated with lymphocytes, these extending into the substance of the pons. Vessels of the pia and the intra-pontine vessels were congested. In many places they contained what appeared to be hyaline clots. The coats of the

vessels were thickened. A peripheral zone of degeneration and many areas of perivascular rarefaction of tissue were present. The cells showed poor staining, probably due to the age of the specimen. No tract degeneration.

Cervical Cord.—The posterior roots were degenerated and atrophied and the interstitial tissue increased. The thickened pia showed extensive extravasation of red cells in the vessel coats and in the surrounding tissue. The cells were in various stages of chromatolysis. The pigment was increased, nuclei destroyed, or displaced, so that only perhaps one tenth of the cells approached the normal.

Thoracic Segments.—Pia thickened and infiltrated and its vessels intensely congested. Amyloid bodies here as in cervical areas were numerous and the zonal degeneration was well marked. There were no tract degenerations. The anterior horn cells were reduced in number and those remaining were in various stages of dissolution, practically none of them being normal.

Lumbar Segment.—The anterior and posterior roots were degenerated, giving to many of the fibers a constricted beaded appearance. Amyloid bodies were present within the posterior root bundles and in the substance of the cord. The pia was somewhat thickened, slightly infiltrated and adherent to the cord. The vessels were thickened and congested. Considerable extravasation of erythrocytes in the pia. The ganglion cells showed different degrees of degeneration, the greater part of them closely approximating the normal.

CASE 2. J. B., No. 7446. Male, age 24. Came to the dispensary of the University of Pennsylvania. Had attacks of twitching of the muscles of the body and jumping of the legs. When this occurred the patient knew he was going to have a seizure and in about an hour he would become unconscious and fall. Claimed that he remained unconscious fifteen to twenty minutes. Had never injured himself during an attack.

CASE 3. A. B., No. 7048. Girl, age 6. Came to University dispensary in 1911. History of a normal birth, sat up at six months and walked at age of one year. Head was bumped against a gas fixture at this age and shortly after she began to have attacks of unconsciousness about twice a month. During these seizures had the typical signs of epilepsy. Also had attacks of sudden jerking forward of the head without loss of consciousness. These movements have been so violent as to break her nose and cut her face and head.

CASE 4. O. G., No. 5633. Male, age 19. At the University dispensary. Maternal grandmother had epilepsy. Patient healthy up to age of fifteen, when he was struck upon the head with a window sash. A year later had a spell of unconsciousness (doubtful). A year after this began to have attacks of jerking of the hands and legs without loss of consciousness. These attacks

occurred at intervals of about a month up to the fifth month, when he had an attack of this character, lasting the entire day, but without loss of consciousness, and after supper the same day had a typical epileptic seizure with loss of consciousness, frothing at the mouth, etc. Since then he has had only the typically epileptic seizures.

CASE 5. T. T., woman, age 32. Inmate of the East Oklahoma Hospital for the Insane. Had typical epileptic seizures since childhood. Several relatives epileptic. In addition to the regular seizures she had attacks of twitching and jerking of all the muscles of the body including neck, but only occasionally the face. The movements are bilateral, symmetrical and produce at times a violent trembling. The patient gradually sinks to the ground during these attacks, but never injures herself. She does not lose consciousness and the attacks could be brought on by suggestion, or even by pointing the finger at her. She had the mean, irritable disposition of the epileptic and had frequently bitten other inmates with practically no provocation. Her epileptic seizures were unmistakable, as they had all the symptoms of true major epilepsy. They occurred rather irregularly, being influenced more or less by her course of treatment.

CASE 6. Mrs. A. W., age 55. Inmate of the East Oklahoma Hospital for the Insane. History of epileptic seizures and attacks of shaking as long as patient could remember. Several members of the family epileptic. Her ordinary seizures were unmistakably epileptic. Between these seizures and occurring without any relative time to the regular attacks, that is, not being in the sense of an aura, etc., she had spells of shaking and jerking of almost all the muscles of her body. She would feel this jerking and be conscious throughout. Under bromide treatment she had only an occasional seizure of the epileptic type.

CASE 7. W. H. Male, age 25. Inmate of the East Oklahoma Hospital for the Insane. Low-grade epileptic imbecile. No epilepsy in family (?). Very severe attacks of epilepsy since childhood. Practically unaffected by treatment. At times had generalized jerking movements without loss of consciousness. These attacks were reduced in frequency by the bromide treatment.

CASE 8. Mrs. B., age 28. For a number of years at different periods has had "spells" of a peculiar kind. Often they would come on during the night, apparently during a sound sleep, and the patient would become cyanosed, once or twice frothed at the mouth and bit her lips. She is or was always sleepy after the attacks. Has voided once or twice during the seizures.

At other times the patient has attacks of trembling, that is, she feels as though she is trembling, but in reality only the muscles of the legs and abdomen are twitching, and she does not shake or move.

Sometimes she would have so-called nervous chills. During

some of her spells the patient was unconscious, though in most of them she knew what was going on, but seemed dazed. Never falls nor hurts herself, as she is always aware of the onset. They are brought on more often by some excitement, such as a family disagreement, etc.

The series of attacks will extend over a period of a couple of weeks, then clear up for an indefinite period. She is usually thin and nervous after them.

The present outbreak came on following an evening at the moving picture show, where one of the characters was probably an epileptic, and had rather peculiar, atypical seizures. In her attacks now—they were formerly general—the left arm, neck and face are mostly involved. She cannot swallow during a spell.

In one of the observed attacks the left side of the face twitched about the rate of 2—4 to the second—the face flushed and tears came to the eyes.

A couple of nights later she had a severe spell in which she drew up her legs and arms, but there were none of the rapid jerky movements. Appeared to be confused and irritable and did not want to remain still—was emotional, muttered and cried. Did not want to talk after the attack, and when she did it seemed as though her tongue were affected in some way. Slight incontinence of urine in one of the spells during the day. Knee jerks increased—no Babinski—has voluntary extension of all the toes. No sensory changes nor paralyses. Eye grounds normal. Reflexes normal during and after the spells.

A very close resemblance could be traced to the seizures of the actor in the moving picture play.

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A CASE OF PURE PSYCHIC EPILEPSY¹

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The Dämmerzustand, or twilight state, of variable length and followed by complete or partial amnesia, is a not uncommon phenomenon in several conditions, especially epilepsy and hysteria. The differential diagnosis is not always easy. It is more difficult when the case presents no other certain differentiating phenomena, such as typical and ordinary convulsions, or local and shifting anesthetics or paralyses, or an alcoholic history, for example. The difficulties lessen, however, the more carefully and exhaustively the patient is observed and the longer he is under observation.

To bring out some of the important diagnostic features, the following case will be reported at considerable length. The patient first came under observation some thirteen years ago, and has been seen at different times by various members of this society. I have not had the benefit of their observations, except that in one instance a diagnosis of manic-depressive psychosis was made.

I will say in the beginning that though the attacks to which the patient has been subject have usually been preceded by occipital headache, or feelings of pain, numbness, tension or congestion in the head, increasing in severity, and in some instances by a difficulty in thinking, both the patient and his wife have stated that they could not tell when an attack was impending.

The case is that of a man, born in 1875, and therefore now 38 years old. He is of American birth and parentage, a very large, strong, healthy man, treasurer and managing director of a successful business.

Family History.—The grandparents died of natural causes. The father, an even-tempered man, died in 1883, at 43, of heart disease. He had one brother and three sisters, all well except one sister who was an invalid in the later years of her life. The mother died in 1902 at 57 of enlargement and fatty degeneration of the heart following rheumatism; she was inclined to worry,

¹ Read before the Boston Society of Psychiatry and Neurology, March 19, 1914.

and is said to have had a "nervous breakdown" at 28, two years before the birth of the patient, and to have been "hysterical" at that time. She was one of four children, of whom one died in infancy; her two brothers were reasonably well, but one of them had two tuberculous sons. The patient is one of six siblings, of whom one brother died in infancy of convulsions following a fall on the head, and another died at 7 of diphtheria; a sister is "nervous" and had "nervous prostration" in 1908 or 1909. The others are well. Epilepsy, insanity and excessive alcoholism in the family are denied.

Past History.—As a boy he was normal, rugged, healthy, cheerful, even-tempered, sociable, athletic, and a good average student, with good powers of concentration. He was a heavy sleeper, but did not walk in his sleep, had no nocturnal fears, no nightmares, no wetting of the bed. He had no tantrums. At 10 he broke his arm while playing. At 14, while watching a game of football, he was run into and knocked over, hitting his head. He was unconscious, and when he came to, he was half a block away, by his own home. There were no sequelæ. At 23 he was operated on for appendicitis, the wound became septic, but finally healed well, without further trouble. He has worn glasses for astigmatism since he was 32 or 33. Venereal diseases are denied, and there is no evidence of them. He graduated from the high school at 17, then was clerk in a local bank for 6 years, and since then has held his present position efficiently. As a man he has continued to be normal, having an unusually happy disposition, taking things easily, easy to get on with, yet strong willed, determined and even obstinate. As a young man he was called a "big baby" by his intimates. He is sociable, being a member of a singing society and other organizations. He uses no alcohol or other drugs, and is a very moderate smoker. Except as will be mentioned, he has never been known to have any fainting or dizzy spells, convulsions, periods of irritability, biting or soreness of the tongue, soreness of the body, somnambulism, nightmares, involuntary passing of urine or feces, or petit mal attacks. There has been no deterioration. He was married in 1900, when he was nearly 25, about five months before his first attack. He had been a little more concerned about his business affairs at that time.

First Attack.—About the middle of February, 1901, he was worrying a little more over his business, as the president of the company had gone away on a vacation without telling the patient about the affairs of the company or leaving any instructions. He began to have pain in the head if he kept long at one piece of work; it was less severe if he changed; it was intermittent, entirely occipital, worse in the afternoons; there was no pain in the back or limbs, no nausea or vomiting. He "felt tired" and thought "something must be the matter with him." This con-

tinued off and on till Wednesday morning, March 13, when he felt "a little upset in his stomach." He went to the office, however, and was able to do his work. At lunch at 1 P. M. he felt "dizzy," couldn't order his lunch, and remembered nothing more till an hour later in his office. He was told that he had been unconscious for three quarters of an hour and had been walked back to the office. That evening he felt perfectly well, "better than for some time"; he had no pain or nausea. Nevertheless he stayed at home till the following Monday..

Second Attack.—On Monday, March 18, he was feeling less well than at any time since the 13th, but went to the office as usual, where he found a large mail awaiting him. At 9:30 he felt tired, said he had a severe pain in the back of his head. He kept at his work, but had difficulty in concentrating his mind on it, spoke of feeling dizzy, and could not accomplish much. He called to his brother to know how to form a sentence. He grew more confused and dull, and went home about noon with his brother, going at once to bed. That evening he talked quietly and rationally till about 8 P. M. when he called his father-in-law and said "I'm losing my mind. Take — (wife) away. I might do her harm." For about ten minutes he talked quietly and sensibly, then asked quietly, "Has the hay been cut?" (Yes.) After a minute or two he repeated the question, then went to sleep and slept till morning. About 6 A. M. Tuesday, March 19, his wife asked him if he were in pain and he replied only "pain, pain, pain." From that time till 5 P. M. on Wednesday, March 20, he lay absolutely mute, his eyes open much of the time but rolling about without fixating anything; he took absolutely no notice of anything about him, even when spoken to loudly. At the end of that period he suddenly sat up, pushed aside his male nurse and shouted "Breakfast! Breakfast! I've ordered it enough! Now bring it! Quick, too!" He at once begun struggling to get up and it took four men to hold him. Effort was made to keep him in bed, but he continued to have frequent periods of struggling, mostly good-natured. He sang songs through correctly, and talked loudly and constantly, often as though he thought himself in the office in the presence of the clerks or of the president of the company, saying "You're a nice fellow to get off and leave me this way," etc. His talk was not incoherent or fragmentary, and was easily followed. He propounded riddles, told stories, repeated the numbers of bonds, figures published by Steel Trust, etc. Laughed heartily at times, especially if he could free himself enough to strike one of his nurses, or propounded a riddle which his apparent hearers could not answer. He was not distracted by events about him, did not pay attention to them, did not recognize his brother, who was with him a good deal of the time, saying when latter tried to identify himself, "No, you're not of this gang of gutter-sweeps,"

referring to his nurses. He was actively hallucinated, telephoning, waiting for reply, then responding in turn. He would sometimes laugh heartily, after listening, then say "Well! that's a pretty good story, John." Sometimes he talked as though he were indulging in horse play with someone not there. He repeatedly addressed an hallucinatory person as "You red-headed lobster," and he prefaced all his struggles by "Well, I'll get up now and split wood." On one occasion he held his breath for a long time, making swimming movements, then lifting his head and blowing as if coming to the surface from having been under water. (Is a fair swimmer.) Throughout his pulse, temperature, respiration were all normal, the pulse not getting above 88 even in his violent spells. He slept poorly, and was given some sedatives without much effect. He took some liquid nourishment. Bowels were regular. He had to be catheterized twice daily.

At McLean. March 24, about 3 P. M. his expression was alert and natural; pupils normal, eye grounds normal; no facial asymmetry, no tremors of facial muscles or tongue; no scars on tongue; no glandular enlargement, no venereal scars; abdomen and cremasteric reflexes normal; knee kicks prompt, slightly more active on left at first but not subsequently; no ankle clonus. Height 6 ft. 2 in. Weight 230 lbs. He allowed himself to be put to bed and a camisole put on, apparently not noticing what was being done; his expression was calm. He lay quietly till 3:30 when he suddenly began singing, sang three songs through correctly, then lay back for about a minute. Then in a matter of fact tone he remarked "Well, I guess I'll get up and chop wood," and began to throw himself violently about on the bed, shaking his head from side to side, paying not the slightest attention to the nurses who were holding him, but looking apparently at some hallucinatory person at the foot of the bed, to whom he addressed various threatening remarks, calling him often "You red-headed lobster." After a minute or two of violent struggling and talk he lay back quietly, to resume his activity again. After a few minutes, while quiet, he had three momentary "convulsions or paroxysms" as the nurse called them, in which he shook heavily as though chilled, with intervals of about 20 seconds. Immediately after the last one he raised his head, looked around for the first time as though seeing his actual surroundings, and asked with a dazed or surprised look, "Where am I?" (Hospital.) "Have I been sick?" (Yes.) "How long?" (About a week.) "What day is this?" (Sunday.) "What, the 24th of March?" and by succeeding questions he quickly oriented himself perfectly, and from that moment appeared and behaved normally. He was amiable, appreciative, inclined to make the best of everything in a hearty way. The following day he gave a detailed account, with excellent memory, coinciding accurately with the data given by his

relatives, of events up to the evening of Monday the 18th. He told of the attack of the 13th (which his family had not mentioned), and said of the events of the 18th that in the afternoon, while in bed, he had had a feeling of lassitude, didn't want to speak, but didn't feel irritable; that about 8 P. M. he felt himself losing control of his mind—couldn't say how or why. Recalled asking his father-in-law to take his wife away lest he hurt her. "After that I got muddled and can't remember anything more till I came to here." He was unable to give a single detail of the six days.

He went home five days after admission, having been perfectly normal. After a few weeks' vacation he resumed business as competently as ever.

Third Attack.—Having been in good health, free from fainting attacks, changes in temperament, or any physical or mental symptoms of any kind, he had on the following October 26 (1901) a severe occipital pain lasting a few hours. He slept well that night. Next day, Sunday, he rested, but on going out to dinner did not seem in his usual good spirits. He slept well that night. On the 28th he went to his office and worked as usual but in the afternoon felt some return of the headache, and got his brother to take him home. He retired early, and apparently slept all night. At 6 A. M., October 29, he went to the toilet, pulled the chain, and returned to bed. An hour later his wife found him in a stupor, paying no attention when she spoke to him. Seen that afternoon by a hospital physician, he lay in bed, apparently awake, but with no evidence of hearing or seeing those about him, even when spoken to very sharply. He occasionally turned over, or drew up and thrust out a leg, rubbed his head, etc. Pulse, temperature, respiration normal, color good, pupillary, patellar and plantar reflexes normal, heart negative; no resistance to passive movements in any part of the body. The next four days he spent most of the time in bed, with normal pulse, temperature and respiration, requiring enemas and catheterization, frequently rolling out of bed, often with a sudden lurch, lying limp when picked up and put back but sometimes stiffening a little when asked to, and always seeming weak. He would open his mouth to let the nurses swab it, but otherwise apparently paid not the slightest attention to strangers or his family, but kept looking at hallucinatory persons. At first he seemed very dull, squirming in bed a little, throwing his arms up over his head, rubbing his face, etc. But he began after the first day to speak a little, often repeating the same isolated word or phrase many times, such as "Oh, dear," "Hell and damnation," "Hell bent for election," etc., or "Once," "Twilight," "Evening." He sang at times, repeated some poems or parts of them. On November 1 he went through gymnastic exercises with an imaginary "Ned," made motions as though

swimming, crept about butting his head against the wall, and would have hurt himself if the nurses hadn't acted as buffers. On November 2 from 9 A. M. to 2 P. M. he kept up a lively game of football, acting the part of guard, rushing, shouting, kicking, dodging, occasionally falling down for a few minutes, then starting at it again. He talked voluminously in the afternoon of all sorts of topics,—Clayton-Bulwer Treaty, McKinley's speech, the Boston Clearing House, stock market reports, etc.; repeated poetry and uttered such single words as "Evolution," "Gravity," "Procrastination," "Hypodermics."

At 6 P. M. (Nov. 2) he kept repeating "Oh! Oh! Oh!" for about 3 minutes then asked, "Where am I?" (At home.) "What makes things look strange?" then quickly oriented himself as before. He continued perfectly clear, though a little depressed at having had a recurrence of his illness. He said he had a confused recollection of visiting the water closet on the morning of the 29th but remembered absolutely nothing till the evening of November 2 when he became conscious of being in his own room on account of the familiar wall-paper, and that then he became perfectly clear as to persons and surroundings in a very few minutes.

He remained well for a year, attending to his business. He then had his *fifth attack*, in November, 1902, when he lost his memory, did not recognize members of his family, threatened to kill his wife, and on one occasion wanted to fight his nurse, but as a matter of fact was not violent. He played golf much of the time during this attack. He thought he was going to build an air-line railway between Boston and Chicago. After 5 days he was tactlessly told of his mother's death and within a few hours regained his normal orientation, with amnesia for the lapsed time.

An interval of six years then intervened before his *sixth attack*, in November 1908, when he lay in a heavy stupor for several days, taking neither food nor drink, requiring catheterization and enemas. He then came suddenly to himself, asked for food and after about 24 hours of apparently normal sleep, he was perfectly normal, but retained no memory of the period of stupor.

His *seventh attack* occurred in 1909; no description was obtained. He may have been for a short time with Dr. Edes.

Eighth Attack.—In February, 1910, one morning he complained of not feeling very well; soon appeared dazed, tried to go to his business, but grew much confused and so weak that he could hardly stand. After a few days he improved, but soon had a relapse and went to Dr. Edes's sanitarium for about 5 weeks. There he was given bromides, and after a time improved, being brighter in the morning; after leaving it was several weeks before he could go back to his business. No good description of this attack was obtained, except that he is said to have had amnesia for part of it.

Ninth Attack.—In February, 1911, on getting out of bed one morning he fell to the floor, was in a stupid, confused condition, sleeping most of the time for about 10 days; during this time he would sometimes speak of hearing running water, and he asked to have an operation performed on his head. He then grew more restless, and more difficult to care for, and after another week or ten days was given a good deal of bromide (at home). After a few days more he got up about 4 A. M., climbed out of a window, fell and tore some muscles of the back and perineum. That noon he became clear, and after his injuries had healed he returned to work as usual. He retained a vague memory for parts of this attack.

Tenth Attack.—On Thanksgiving Day, November 30, 1911, he appeared a little peculiar to his wife. Next day, while trying to write up the stubs of his check-book he collapsed at his desk. His work was nothing but scrawls. Put to bed, he kept talking to an imaginary person, paying no attention to those about him. He would snatch at food occasionally, but ate little. He remained in this condition till December 10 when he became clear, with amnesia. The next three days he remained so, but complained of a drawing sensation in the back of his head. On December 13 he went with his wife to see Dr. Prince, and on the way complained of the auto jarring his head, and he was a little irritable at his wife for going with him. On his return he seemed quiet and depressed, but clear, and after lunch started for a walk alone. He returned at 5:30 P. M. wet to his shoulders, having evidently waded into some pond and ducked his head without immersing his shoulders. His hat was dry, though his hair was wet. He seemed confused, talked in a dazed way of someone coming to get him, but he went upstairs without help, brushed his hair, and then allowed his wife to put him to bed, where he remained for a day or two. Then he grew restless, said he had killed a man, that he was well, and he tried to get out with only a blanket on. He was brought in an automobile to McLean December 15, 1911, where for four days he showed a general dulling of all his psychical and neural processes, hearing a watch only at a few inches, uncertain as to how many fingers were held before him, unable to tell time, only crudely recognizing things in his hands, with diminished sensitiveness to touch and to pain, and with diminished capacity to localize tactile sensations; the pupils were equal, of moderate size, and reacted promptly to flash-light; the left knee jerk was possibly slightly greater than the right, but the test was unsatisfactory; Achilles reflexes slight and equal; plantar reflexes equal, slight; no Babinski reflex. He was weak physically, was slow in his movements and speech, and fumbled in tests for recognition of objects in his hands. He was actively hallucinated, and it was difficult to get his attention from

the voices he heard and the man he saw. He was dull of comprehension, and was completely disoriented. He gave his name, but thought he was about 50 years old (36), that he was not married, that he had never done any work; he didn't know his address, or whether his parents were living, etc. Simple subtraction was poor, multiplication was better. He had a crude appreciation of the fact that he wasn't well. (Memory good?) "I guess not." (Head clear?) "No." (Feel blue?) "No." (Feel happy?) "I don't feel much of anything." (Why slow?) "I don't know. I guess something's the matter with me." He kept constantly talking to an imaginary person, having chiefly the ideas that he had killed a man, and that this hallucinatory man was urging him to do something that he didn't want to do—probably commit murder. There was some tendency to perseveration in his replies both to the hallucinatory voices and to the examiner's questions.

On December 19 he was seen in the morning by four physicians for about 15 minutes. At 3:45 P. M. he got out of bed as though just awake, looked about in amazement, asked where he was, and on being informed, told the nurse of his being here several years before. He was depressed at having had another attack. At 4 P. M. he was pretty clear and well oriented, but still a little retarded; he could recall vaguely that several men had been in that morning, but not what he had eaten for dinner, nor whether he had eaten it in bed or in the dining-room. He recalled being rather depressed Thanksgiving Day, and its being hard to concentrate his mind on his work next day and having visited Dr. Prince one day, but not what advice had been given him. He recalled vaguely having gone for a walk after lunch that day and having got wet, but he could give no details or reasons. The rest was a blank, except that he remembered vaguely riding in an automobile. When asked leading questions he said he could recall thinking he had killed a man. He was much depressed. Sensory examination showed a little dulling, but not nearly so much as before. For the next 3 days he had at times active auditory hallucinations, occipital pain and headache, variable moods, especially depression and irritability, and some thinking difficulty, but he was approximately oriented.

On the morning of December 22 the pupils were equal and normal in reactions: the knee reflexes were moderate, the left being a trifle larger; the Achilles reflexes equal and moderate. Tactile sense not appreciably diminished; localization of points only slightly diminished; hearing slightly impaired; no narrowing of the visual fields. He was retarded, and it took him $2\frac{1}{2}$ minutes to make continuous subtraction of 7 from 100 with paper and pencil; while doing this he said aloud two or three times "Do it," without being aware that he did so. When asked why he said it, he replied that he had not said it, but that someone had

said it to him. At a quarter past four that afternoon he suddenly announced that he felt like a new man, and asked to see the examining physician. At that time he had a rather confused recollection of the examination that morning, and of the events of the preceding three days, with the hallucinatory voices. On the morning of December 23, he was alert, not depressed, was fully oriented, prompt in replies and accurate in memory for all but the periods of complete and partial amnesia. For the latter, the things he could recall were accurate, but there were gaps, and the details were not sharp. (Remember thinking you had killed some one?) "It seems as though—it's like a dream. It seems as though there was a struggle and that I killed him. That's all." 100—7 in 15 seconds. Sensory examination was normal. He made a perfectly normal impression.

From December 24 to December 31 he was again much confused, threatening, talking of having killed a man, etc., with a few brief periods of sudden clearing in which he had only fragmentary recollections of the confused periods. He then remained clear and oriented, but a little suspicious, critical and depressed.

He went home, and on January 7 following he again became quite depressed, then confused, in a stupor, neither eating nor urinating, and was brought back to the hospital in an ambulance on the 10th; for three days he was quite disoriented, talked fragmentarily of burning fires, of cremation, of the Himalaya Mountains, etc., and at 5:30 A. M. on the 13th cleared suddenly, with good orientation, and amnesia for the 6 days, except that he remembered indistinctly his being brought in a van (ambulance) and struggling with the nurse on the way. Association experiments with the standard list of 100 words, followed by free associations with the most notable responses led to no "complex indicators." The only noteworthy event during the tests was that when the word "sheep" was given him, he seemed abstracted for an instant, then asked if "sleep" were the word, and on being signalled to go ahead, gave the association "move." This whole reaction took only 5.4 seconds. It is possible that this was a momentary *absence*, the only one observed. But such episodes occur sometimes with normal persons.

Neither by this method nor by asking direct and leading questions, could any memories of the completely amnesic periods be aroused, and only vague, hazy and disconnected ones of the partially amnesic periods. He gave, however, a very full and detailed account of the normal intervals, and showed no evidences of deterioration.

We have then a man, now 38, whose personal make-up and whose heredity have been unexceptionable, except that his mother is said to have been at one time "hysterical" and whose sister has had "nervous prostration." Without any evidences of con-

vulsive seizures he has had since the age of 25 several attacks characterized by the sudden onset of a condition in which there have been, in one or more, automatic and somnambulistic acts, a fugue, narrowing of the intellectual field, general diffuse dulling of the psychic and sensory activities, even to stupor, complete disorientation, vivid auditory and visual hallucinations, delirious ideas different in the different attacks, a tendency to perseveration and to stereotyped repetition of words or acts, flighty associations, hilarity, depression, psycho-motor retardation, muscular weakness, and fumbling movements, but no localized anesthetics or paralyses.

These attacks have usually been preceded for a few hours or a day or two by an unmotivated depression, a thinking difficulty with feeling of confusion, and especially by an occipital headache growing more intense. But these have not been pronounced enough to be regarded by the patient or his family as indicating an impending attack.

Following the attacks there has been sometimes complete amnesia, beginning and ending at a definitely determinable time or event, at other times an almost complete amnesia, but with a few hazy patches of recollection, and somewhat less definite onset and emergence. It has not been possible to revive a memory of the events of these periods. There has been a period of depression lasting a few days or even weeks after the attack.

In the intervals between attacks the patient has had an unusually accurate memory for details, and has shown no mental deterioration.

Since he has had then in one or more of the attacks some of the symptoms which may be seen in epilepsy, hysteria, manic-depressive psychosis, alcoholism, dementia præcox, and prison psychosis, each one of these conditions must be considered in making a diagnosis.

Although he has not had any known convulsions, unless the chill-like episode of his first attack can be regarded as such, he has not shown any symptoms which may not be seen in the psychic states of idiopathic epilepsy.

Twenty-five years ago Féré showed that there was frequently dulling of the different senses and slowing of response to sensory stimuli in the quarter or half hour following a convulsive seizure, and Spratling demonstrated a dullness of the pain sense and of

hearing during a fifteen minute twilight state. Féré also showed muscular weakness to be not uncommon. Delirious ideas, disorientation, "reduction" of the psychic field, automatism, somnambulism, fugues, preseverations and stereotypies are well known phenomena. Depressions are not unknown, and Spratling speaks of cases with laughter and hilarity. Flighty associations are not so common. I have not seen them mentioned, nor do I recall any instances in the cases I have seen, but they occur in so many different conditions that their diagnostic significance taken by themselves alone is not very great, and there is no *a priori* reason why they should not occur in epilepsy.

It is probable that a continuous series of cases could be shown ranging from those having only convulsive seizures, through those with many convulsions and an occasional *dämmerzustand*, and those with few convulsions and many *dämmerzustände*, to those with only the psychic states. The latter, of which some have been reported in the literature, are cases of so-called pure psychic epilepsy; Kraepelin quotes Starr as finding in nearly 2,000 cases of epilepsy only 0.8 per cent. of purely psychic cases, and Spratling finds even less—four cases out of 1,325 epileptics.

Most of the investigations on the psychic state of epileptics have been made either just after—within 15 or 20 minutes—a convulsion or in the comparatively normal state between convulsions. In a hasty and superficial glance through the literature I find very few made during a so-called psychical equivalent. A general psycho-sensori-motor dulling rather than a limited or localized dissociation seems to be the type of change, which is that seen in this case.

Since it seems to be a fair inference from the association of the convulsive attacks with the psychic states that they are both due to a common underlying cause or condition, and since the symptoms seen in this patient have the characteristics seen in the psychic equivalents of epilepsy, the inference seems fairly well justified that the condition underlying his symptoms is the same as that underlying the seizures and the twilight states of idiopathic epilepsy, and on this ground I make the diagnosis. That this underlying condition is unknown and that the condition underlying the other diseases (some of whose symptoms some of the patient's symptoms resemble) is also unknown, does not signify that they are therefore identical or not differentiable.

If I may digress a moment I would like to say that I think we lose much when we give up the conception of disease entities or underlying conditions, and try to make diagnoses on the basis of clinical pictures or symptom-groups, as we are apt to do in psychoneurology and psychiatry. Diagnostic effort is directed to finding out what is the matter with the patient. If we make our diagnosis on the facts that he shows this or that symptom-complex or shows this or that clinical picture, we shall often err. For any given symptom-complex or clinical picture (as mutism and resistiveness) may be found in widely diverse conditions, and on the other hand any given condition may give rise to widely different clinical pictures (for example, the wide diversity of clinical pictures in general paralysis). To seek then for a diagnostic symptom or symptom-complex is a vain and fruitless search, and leads only to misunderstanding of the relative importance of symptoms, and to waste of energy.

Diagnosis should always be regarded as an *inference* from the facts *as to the underlying condition*. This attitude sets the definite problem of finding out this condition, of differentiating between cases which present symptom-groups which are superficially similar but which arise from different causes or on different grounds, and leads to greater accuracy. It is the attitude of general medicine and surgery and should be that of psychiatry. If this conception had been kept in mind, it would have been impossible for a writer to have said, as was done in this Society within a year "While the sufferer from obsessive psychosis may drift into chronic hypochondria or into manic-depressive insanity, he will become a case of dementia præcox only if he has the inherent brain defect which limits development and predisposes to deterioration."

I would like to continue my digression to speak of nomenclature. Just as we need the conception of disease entities or underlying conditions, so we need names for them. And it is better to keep the old, long-used, familiar names for a given disease-entity, even though the latter be a quite unknown x , in order to distinguish it from another different but perhaps equally unknown y , or from a known a or b . And it is better to keep them to denote the clear-cut conception, even though later knowledge shows the theory embodied in the name to have been fallacious. Modern medicine is full of such terms—such as malaria,

measles, etc. It does not trouble us now-a-days to speak of malaria, even though we know it is not a "bad air" disease. Neither does it trouble us to speak of general paresis in the absence of paresis. It should not then trouble us to speak of manic-depressive psychosis in the absence of a manic or a depressive condition, or to speak of a dementia præcox which arises comparatively late in life. It would not trouble us if we recognized that each of these terms should signify a disease entirely different from that denoted by the other names; many of these names having been given under a mistaken theory of the origin or essential nature or characteristics of the disease. It is when names like those are used purely symptomatically, to denote a symptom-complex, that unnecessary difficulties of diagnosis arise—there are enough unavoidable difficulties without adding avoidable ones. If what should be diagnostic terms are used symptomatically, we lose them for diagnosis, make unnecessary synonyms, and create confusion.

On these grounds it seems to me more helpful and more scientific to keep the term epilepsy for the cases having a presumably common unitary underlying condition, and to name the so-called "symptomatic epilepsies" epileptoid states or conditions—just as in general medicine we differentiated typhoid fever from typhus fever, or now speak of rheumatism and the rheumatoid diseases, and in psychiatry differentiate paranoia and paranoid conditions. To give up "epilepsy" and speak only of "the epilepsies" is to make the word a blanket to cover essentially different things, while the general trend of scientific advance is to narrow and sharpen the conceptions connoted by words.

But to return from the digression.

Hysteria must be considered in this case, because there appear attacks of mental "reduction," with automatisms, somnambulism, fugues, perseverations, hallucinations, delirious ideas, disorientation, with sudden onset of and emergence from the attack, and amnesia for it. But the manifestations of hysteria are almost if not quite invariably initiated by some strong emotional cause. The hallucinations and delirious content are apt to be reproduced in successive attacks, perhaps more often in hysteria than in epilepsy, and are usually capable of being brought to memory in the normal state, while in this case they were different in each attack, and could not be recovered, though not all

methods by any means were tried. Indications of special complexes are comparatively easily elicitable in hysteria, while here none were found. In hysteria the sensori-motor disturbances are apt to be localized and more or less shifting and variable while in this case they were general and diffused, and not shifting so far as observed, and there were no localized anesthetics or paralyses. Janet speaks of the hysteric patient usually being quite comfortable and normal on emergence from the attack, while this patient was usually depressed and not up to par for a few hours or a few days.

From the absence of some of the characters that seem essential to hysteria, there is not sufficient ground on which to base that diagnosis in this case.

In manic-depressive psychosis we see at times mental confusion, even to the point of stupor, with hallucinations, and sometimes with a certain degree of amnesia for the period of confusion; we also see psychomotor retardation, thinking difficulty, disorientation, depression, or exhilaration with flighty associations and over-activity; and occasionally we see sudden changes, such as sudden lifting of a depression—"the cloud lifted at 9.25 this morning"—or sudden temporary clearing in rather confused manic states, with efforts at orientation.

But the confusion and stupors never come on suddenly, out of a clear sky, the muscular weakness occurs only as the result of exhaustion, and there is no sensory dulness, except in profound stupors which are rarely seen. The amnesia, if it exists, is usually less patchy, and never begins and ends sharply; when depression lifts suddenly there is never any amnesia for the preceding state.

The depression in this case is a rather normal reaction to the appreciation of the fact that he has had another attack, that he doesn't know when to expect another, nor how many he will have, and that he is liable to be incapacitated for work for an indefinite time. It is not a fundamental one. The excitement and flight of ideas were more automatic and mechanical, and not the free labile activity of the usual manic case, and at no time did he show the distractibility that goes in manic cases with as much flight and hilarity as he had. The rather sudden temporary clearings in manic cases I have no explanation for. It is very rare that the

manic state ends in that way, as the recovery is usually gradual, even in cases having such remissions.

Thus there are lacking sufficient evidences to warrant the inference that the manic-depressive condition underlies the symptoms in this case.

For dementia præcox there is little except the stereotypy, the perseveration, and the fugue. But these symptoms, if they occur in dementia præcox, do so during full consciousness and without amnesia. In the presence of mental confusion it is dangerous to make the diagnosis of dementia præcox, anyway. Besides, in this case there is no dementia at the end of 13 years. In reality, nothing speaks for that diagnosis.

The clear history of non-use of drugs or alcohol is sufficient to exclude the possibility of a psychosis due to them.

The fact of the patient's never having been under such conditions as give rise to the prison psychosis would rule out the consideration of that condition, even if it is to be considered as an independent disease entity, which I think is doubtful. Many of those cases are in defectives, and in that class not only is epilepsy not uncommon, but also anomalous psychotic episodes arise which are with difficulty classified. And the histories of some of the reported cases strongly suggest hysteria, and of others dementia præcox. So we probably have to deal in the case of prison psychosis with anomalous and atypical cases of some of the comparatively well-known psychoses.

There remains to be considered the possibility of different psychoses in different attacks, especially as the patient showed some over-activity followed by depression, probably in his seventh or eighth attack. But the onset of every one was said to have been sudden, and he had amnesia for a part of each, while his mental confusion does not appear to have been great enough to have been followed by so complete and sharply limited an amnesia, if the attack had been one of manic-depressive psychosis. Furthermore, the patient and the family describe the attacks as being all alike in general nature. It seems a fair inference, therefore, that in spite of some excitement and some depression (symptoms which may be found in almost any psychosis) the same underlying condition was responsible for his symptoms in all the attacks.

Hence, not only on positive grounds but also by exclusion of other conditions, I have felt justified in making in this case the diagnosis of pure psychic epilepsy.

A NOTE ON THE RELATIVE WEIGHT OF THE LIVER AND BRAIN IN PSYCHOSES¹

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This is the first of a series of papers concerning the condition of the organs in the psychoses. It is not intended that any solution of the problem of causation of any of the psychoses shall rest upon the facts adduced. At the same time since a relation of brain changes to many of the psychoses has not as yet been determined, it is prudent to state that there is at least some ground for expecting that light on the pathology of the psychoses may come from a systematic study of the organs.

The liver has been selected as the first organ to be studied and this paper concerns itself entirely with the weight of this organ, as compared with the weight of the brain, in persons dying in Taunton State Hospital. The reason for this selection becomes obvious when one remembers that the one organ of the body which under normal conditions is heavier than the brain is the liver, and that therefore the weight ratio affords a convenient measure of orientation. Considering the changes in liver and brain, it is obvious of course, that a vascular organ, like the liver, whose weight varies under many conditions, can give no direct information so far as its weight is concerned, in the problem of the pathology of the psychoses. Nevertheless, an examination of the statistics obtained from the records of the Taunton State Hospital and elsewhere brings to light some *interesting* facts regarding the comparative weight of the liver and brain, and as such and such only these facts are presented.

At twenty-five years of age the average liver weight in males is 1,600–1,700 gm., according to Vierordt. The average brain weight at that age in males is 1,290–1,350 gm. In the female at the corresponding age and period of life, the average of the

¹ Taunton State Hospital Papers, 1914, 4. Read before the Boston Society of Psychiatry and Neurology, March 19, 1914.

liver is from 1,520–1,600 gm., and the average weight of the brain, 1,200–1,275 gm., that is to say the ratio of the liver to the brain is, roughly speaking, somewhere around 16–13.

Now in the progress of life this becomes changed under normal circumstances; that is to say, the brain at the age of forty or thereabouts, reaches its maximum weight, and from forty to sixty there is a slow, steady decline, although until the very advanced senile stage, the decline is not very marked. The liver weight remains stationary from thirty to forty and then undergoes a more rapid decline than does the brain, so that at seventy to seventy-five its weight is somewhat less than the brain weight even in normal old people. However, in the normal senile, the weight of the liver is rarely under 1,100 gm.

In looking over the factors that enter into the cause of change in ratio of the brain and liver, the first thing to strike me was the state of nutrition in the individual. That emaciation markedly reduces the weight of the liver has been borne out in animal experiments and, in addition, is a well known clinical fact. Under emaciation then, changes in ratio of these two organs are to be expected even in young people since the brain suffers but little loss of weight in starvation. Therefore, my cases have been placed for this preliminary study under two headings, Emaciation and Non-Emaciation.

It is necessary to state at this point that the cases which have been selected were free from any local disease of the liver itself, such as carcinoma, abscess, cirrhosis of definite type, etc., and nutmeg livers have been excluded.

Series 1.—(a) Emaciated Senile Dementia Cases. Total number of cases twenty-five. Most of these cases were females, average weight of the liver, 940 gm., average brain weight, 1,070 gm. It will be seen that there has been a marked reduction in the weight of the liver. The reduction in the brain weight is not so striking as otherwise would seem, since I have stated that most of the cases were females, and the average weight of the brain in normal female senility is not much more than 1,100 gm.

(b) Non-Emaciated Senile Dementia Cases. Twenty-five cases, a little over half of whom were males; weight of liver averaged 1,270 gm., average weight of the brain, 1,270 gm. There is then in this series, a change of the liver ratio to the brain

ratio, regardless of the state of nutrition. The liver, in these cases, has suffered an atrophy which is very much more marked than any corresponding change in the brain, and in fact the microscopic examination showed, in a great many of the cases, a very marked fatty infiltration of the liver, so that the actual reduction of the liver tissue was much more extensive than is evident from the weight figures themselves. In other words, while *emaciation* is responsible for much of the reduction of the weight of the liver in senile dementia, *there is a reduction of the liver weight irrespective and independent of emaciation*. Moreover, the brain does not partake in the senile atrophy to anything like the extent that the liver does. In other words, if brain changes are measured by the weight changes they are much less marked in senile dementia cases than are the liver changes.

Series 2.—I have taken a group of Dr. E. E. Southard's cases of dementia præcox as considered in his well-known paper on "Focal Lesions in Dementia Præcox." He found the liver weights of the males in the series to average 1,369 gm., in the females, 1,257 gm., as compared with the normal male, 1,579 gm., normal females, 1,525 gm. This change he comments upon in a short paragraph, but states that he cannot account for it. The brain weight, though reduced somewhat from the normal, was less reduced. Since a large number of dementia præcox cases die emaciated, the change which is here recorded, may, on the surface, be a loss of weight due to emaciation. However, I have analyzed some of his figures a little more closely and can present the following facts. Eight cases of dementia præcox in the third decade (from twenty to thirty years of age) showed a liver weight averaging 1,438 gm., brain weight, 1,341 gm.; in the fourth decade the liver weight averaged 1,192 gm., the brain weight, 1,220 gm. In the group of cases in this decade that he has recorded here, there is a drop in the liver weight so that it was less than the brain weight. Since, however, it is not stated whether or not these cases were emaciated, it is difficult to evaluate this change. In the fifth decade the liver weight averaged 1,350 gm., the brain weight, 1,250 gm. In the sixth decade the liver dropped still further and after the sixth decade showed the usual senile change. Emaciation is not here recorded, so that I am not prepared to say whether that factor had any bearing in the loss of weight.

Series 3.—(a) Eleven cases of emaciated general paretics, liver weight, 1,330 gm., brain weight, 1,277 gm. All these cases were forty years or under. Note here that the liver weight has dropped from the normal quite markedly, but has not reached the weight of the brain. (b) In fourteen non-emaciated paretic cases the liver weight, 1,470 gm., brain weight, 1,250 gm. It will be seen that in cases of paresis, even with emaciation, the liver does not lose in weight to the extent that it does in many cases of dementia præcox. Some of my own cases of dementia præcox, not here recorded, show liver losses down to 800 gm., and reaching in some cases even to 600 gm., while practically none of the paretic cases show any such change. This may be due to a connective tissue increase in the livers of paretics, but so far as my studies go, there is very little such increase in paresis, and I cannot account for the maintenance of the weight of this organ in this disease. It is probable too that the brain weight in paresis is not a fair index of the brain changes, since there is a large increase in the neuroglia which makes up for the loss of weight in other directions, *e. g.*, in the nerve cells.

Series 4.—A group of young epileptics, that is from twenty-five to forty, dying of sudden diseases and all well nourished. These cases were selected from the Monson State Hospital records, and I here wish to express my obligation to Dr. D. A. Thom, the pathologist of that institution, for his kindness in furnishing me the statistics here recorded. These cases were selected so as to eliminate so far as is possible, such factors as tuberculosis, diarrhea, emaciation, etc. Most of the cases died of suffocation, acute lobar pneumonia, edema of the lungs, etc. The results were rather surprising. In thirteen cases the liver weighed 1,150 gm., the brain 1,260 gm., a very marked reversal of the expected ratio. In seven cases the liver weight averaged 1,350 gm., the brain 1,300 gm. That is to say there was in the smaller series a somewhat heavier liver than brain and in a larger series a much lighter liver than brain. It is of course obvious that so small a series is not sufficient from which to draw conclusions. Nevertheless it points out a line of research in epilepsy. Moreover, in looking over the protocols there are more changes recorded in the organs of epileptics than are recorded in the organs of paretics. That is to say on superficial investigation there seem to have been

more definite organic changes in a disease not known to be organic, than in a disease definitely known to be organic. Whether these changes are due to the epileptic attacks or cause them can only be determined by an extensive study of a long series of cases. It would even be necessary to note whether these changes showed a definite relation to the number and severity of the attacks, or whether they are very marked in those individuals dying after only a few attacks, etc.

A point which I wish to make is that senile dementia and paresis have one feature in common, which is that the changes in the brain found in both these conditions select the frontal lobe as their first and foremost place of incidence. The explanations for this which vary from the vascular distribution, venous drainage and biological order of development, are on the whole unsatisfactory. Not enough study has been done on the changes in the organs in general paresis and senile dementia. For example, Alzheimer in his elaborate monograph on the histo-pathology of general paresis, dismisses the changes in the organs in a brief page or two, although admitting that there may be diagnostic changes in other places than the brain. It seems to me possible that there may be a grouping of bodily changes which brings about changes in the brain, and that even in a disease where brain pathology is a definite field of knowledge, investigation should be carried on to discover whether or not there are corresponding changes in the organs.

Society Proceedings

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

MARCH 19, 1914

DR. HERBERT B. HOWARD in the Chair

Dr. E. Stanley Abbot read a paper entitled "A Case of Pure Psychic Epilepsy."

Dr. Edes said he saw the patient in two attacks, which he thought were the sixth and seventh of Dr. Abbott's series. He knew he had had severe attacks previous to the attack in which he saw him, but he did not know how many. The attack in which he saw him was severe enough to make him go to the hospital. Dr. Edes recollected many of the curious things that occurred, some of which were amusing. He seemed to be giving a kind of a lecture and not a foolish one by any means, to some imaginary persons, and fought with imaginary persons. He repeated poetry correctly and with expression.

There is only one thing that Dr. Abbott said that Dr. Edes did not agree with fully, i. e., the absence of anesthesia. Dr. Edes made the diagnosis of hysteria. There was one time when he had very distinct anesthesia over the back of the neck. Dr. Jelly said that the case seemed more like one of hysteria. Several regarded it as hysteria. There was nothing in the nature of a convulsion, unless his struggles on the floor more than once when he was conscious might be so called, and they could not be looked upon as epileptiform convulsions.

Dr. Prince said his notes were more detailed than Dr. Abbott's for the attack that occurred on Thanksgiving Day. For two days he had been in a condition of depression (as he afterwards stated), and between seven and eight o'clock in the evening of the day he was taken, he sat at his desk and wrote checks, which were made out in an unusual handwriting. He was heard to go down into the cellar a second time, to look at the furnace, which was unusual. The maid noticed that as he went across the kitchen he shuffled his feet. After his return, his wife saw him at his desk. He seemed unconscious. She spoke to him and tried to make him retire; after some urging, he shuffled upstairs, with knees bent, and went to bed.

Dr. Prince saw him the day after, and he seemed to be unconscious. They said he had been in that condition ever since going to bed. It might not have been unconsciousness, but he gave that impression. His eyes were half open. There was a constant trepidation, like a clonus, of both legs; no tremor; no other convulsive movements. How he came out of that attack is not known, but Dr. Price saw him twelve days later, when he had amnesia, as Dr. Abbot has described.

There are one or two significant facts, if they are facts: The wife and

the family physician state that the attack was brought on by mental shocks. On one occasion, Dr. Jack of Melrose who had the case in charge, thought it was brought on by a threat he made intentionally to be overheard. He was not positive, but thought it was a factor. On another occasion when he jumped off a piazza he came out of an attack; and the news of his mother's death seemed to bring him out of an attack. Ordinarily he came out of his attacks practically in his sleep. He "usually sleeps them off," as he describes it. Of course, some phases of the attacks were distinctly somnambulist.

On the whole, Dr. Prince was inclined very strongly to agree with Dr. Abbott that this is a case due to that underlying condition which we call "idiopathic epilepsy," whatever that may be. On the other hand, it is very important to distinguish between the different kinds of somnambulist states for the reason that there are quite a number of attacks resembling this very much that are not due to that underlying condition which we call "epilepsy." Therefore, it is very important to distinguish between the two, as all writers agree. When they are not due to that, the cause is psychogenetic; when the latter is the case, they are more amenable to treatment, and should not be classed as epileptics. Where the emotions play a strong part in the etiology of the somnambulism, the case should not be called epilepsy.

In this case, it seems that the only disease which has to be differentiated is hysteria, and in practice the differential diagnosis is much more difficult than it is in the books. It is not important whether there is amnesia or not, or whether one comes out of the attack suddenly or not. Dr. Prince had known cases of hysteria to have attacks without amnesia and with only mental stigmata. In this case, the large number of attacks, over a long period of time, in a man who is not only physically strong, but intelligent, of good character, and of good physique, the attacks coming on without any apparent reason, suggest on the one hand psychic, and on the other real epilepsy. Psychic epilepsy or not, this is a rare case. Dr. Prince's conception of an epileptic fugue is one which doesn't differ in its final makeup from an hysterical fugue; after being once developed, it is the same in one case as in the other; there is dissociation of consciousness, a rearrangement of psychic functions, delirium, etc., or what you please, so that when the state is developed, there is no difference between hysterical fugue and epileptic fugue. Hysterical diseases of the mind are due to subconscious influences, whereas we assume that epilepsy is due to organic conditions of some kind, though we don't know what they are; but they may bring about the same disturbances of consciousness that hysteria does. Therefore, we have a bridge between epilepsy and hysteria, only a very important difference is in the factor of genesis.

Dr. Prince recalled very well a man with epilepsy who used to come to the City Hospital, who had typical convulsions. One day he was sent to the Island in an epileptic fugue. This case may have been a combination of hysteria and epilepsy, but that rather confuses the issue.

Dr. Courtney thought this case ought to be treated as if it were hysteria. He remembered so well a case of apparent epilepsy that he sent to Dr. Sidis to study. He studied him for some time, and came to the conclusion that it was epilepsy, and said he could not do anything for him, but a psychogenetic factor was finally found, and the patient completely recovered. It proved to be a case of hysteria. This shows how one can

be mistaken in these cases. The question of treatment is important, and diagnosis is doubly important, as the treatment depends upon the diagnosis. It would be a great mistake to put this man on a continuous bromide treatment.

Dr. Walton said that, agreeing as he did with the reader's underlying principles regarding diagnosis, he was sorry to have been quoted as departing from those principles, in stating that a case of obsessive psychosis can drift into manic depressive insanity but not into dementia præcox unless the patient has the inherent brain defect predisposing to that disease. This was equivalent to saying that dementia præcox had a definite organic underlying basis, but that obsessive psychosis and manic depressive insanity were rather outgrowths of temperamental makeup. In other words, the statement gave due consideration to the genesis of disease whether the opinion regarding that genesis was correct or incorrect.

Coming to the case which the reader has so carefully analyzed, Dr. Walton was far from satisfied with his diagnosis. In the first place, an hysterical trend seems fairly established, and cannot be left quite out of sight, even though another diagnosis may be applied to the main condition. We are too apt to overlook the possibility of a combination of two morbid processes or tendencies in the same individual. Supposing, for example, the diagnosis epilepsy is made. It by no means follows that all the symptoms are symptoms of epilepsy. In the second place, Dr. Walton was not convinced that the reader had established epilepsy, whether alone or in combination with hysteria. Indeed, the duration of the attack argued strongly against epilepsy, for Dr. Walton was by no means in accord with those who deem protracted fugues as epilepsy, much less would he include under epilepsy attacks of manic excitement continuing for days. Again, the reader has emphasized the suddenness of onset as arguing in favor of epilepsy, whereas, as Dr. Walton understood the history, in one of these attacks at least, there was distinct onset of depression for a couple of days, and in another, as the reader puts it himself, the patient was worried about his business for some time before the attack came on, and from Dr. Walton's point of view, the worry and the depression were essential factors.

The first attack Dr. Walton saw in two stages, the first with Dr. Jack, when the patient was in a long-continued stupor which, taken by itself, might have been a symptom either of manic depressive insanity or of dementia præcox; in the second, in which Dr. Walton saw him with Dr. Jack and Dr. Baldwin, he was in a state of maniacal excitement, requiring four or five strong men to hold him; he was confused and hallucinated. The diagnosis Dr. Walton made at the time was "Acute Confusional Insanity," a diagnosis then in vogue, now merged into manic depressive insanity. According to the modern nomenclature, rather than diagnose the case as epilepsy, he should be inclined to regard it as one of manic depressive insanity with brief, but severe, attacks of stuporous depression and of violent maniacal excitement, the picture being somewhat tinged by a hysterical tendency.

Dr. Courtney said there was just one feature about the case which stamps it absolutely as epilepsy, and that is permanent amnesia, which never occurs in hysteria or in cases allied to epilepsy. That symptom alone would warrant a diagnosis of epilepsy.

Dr. Courtney could not agree with Dr. Walton that these so-called

"twilight states" are of brief duration. Somnambulism goes on for months and clears up with memory of every act that has been performed during that period of time.

Dr. Knapp said there have been attempts to differentiate between hysterical and epileptic attacks on the ground of certain specific distinctions which actually in some cases do not obtain. Dr. Walton has been insisting that the epileptic must present in the attack a total and complete loss of consciousness. An epileptic under Dr. Knapp's care does not always present that. She has had attacks during which she has answered questions which were put to her, and concerning which she has memory as to what happened during the attack. At other times, she has typical epileptic seizures, with loss of consciousness and of memory.

Dr. Knapp had a man in his service, at the hospital with a typical epileptic attack, and for several days after, while in the hospital, he was in a dazed state, in which he acted strangely, especially at night, doing various peculiar things, which his family asserted were characteristic of his attacks. Dr. Knapp had seen attacks which were clearly hysterical, yet of very short duration, and coming on in sleep, which is regarded as contrary to the ordinary rule. At the same time, Dr. Knapp felt that these long-continued conditions such as Dr. Abbot described are not characteristic of the epileptic attack, and, although Dr. Knapp had not seen the case, he thought that there were certain hysterical conditions associated with the attacks from various accounts from men who have seen the case, which may exist possibly in the epileptic condition and disguise it.

Dr. Knapp understood the characteristic condition of a true epileptic attack to be complete unconsciousness. He had seen seizures in which there was a partial retention of consciousness throughout the attacks. He had also seen typical epileptic seizures at other times in which there was no memory after the attack. In the case to which he referred, consciousness was retained through the attack, the patient would respond to questions that were put to her, and remembered them later.

Dr. Henry C. Baldwin saw the patient twice. Neither onset of the sickness was sudden. The first time that he saw him there was a history that he had not been normal for a month, and that his wife had noticed that the patient did queer things. When he saw him with Dr. Walton four men were holding him in bed and he was singing in tune, with a voice that was not hoarse although he had been singing for a long time. During this visit he held his breath for fully two minutes apparently; when he stopped holding his breath, he went through the motions of swimming. No diagnosis was made, but Dr. Walton and Dr. Baldwin felt that he should be sent to McLean and he was committed.

The case at that time seemed to be one of acute excitement demanding care and Dr. Baldwin was very much surprised to find that he had gone home well two days after his admission to McLean. He came to Dr. Baldwin's office the second time in 1908, with a history that he had not been well for two months. He had gone off for a rest in September and felt better for the rest, but he still complained during all this time of numbness in the back of his head. At the time that he came to Dr. Baldwin he complained of not eating well and of feeling depressed.

He was 6 feet 3 inches tall, weighed 250 pounds, and had a normal pulse of 72 and normal reflexes.

On testing his sensation, he could not distinguish between the point

of a pin and the head on his face, arms, body or legs. He had no hallucinations of hearing or sight.

Dr. Baldwin made a diagnosis of the history with a question mark after it and sent him to the medical baths for an electric light bath. The next morning his brother said that the patient had relapsed into a state of unconsciousness. The brother was told to call in the family physician.

Dr. Baldwin did not recognize this case under the title of "Psychic Epilepsy" and was not able to agree with this diagnosis. In the first place, in the cases of psychic epilepsy that he had seen, there have been no long confusional attacks, such as this man has had, and there has been complete amnesia.

Psychic epilepsy has been chosen as the ground for defence in two murder trials—the case of Palmer, who killed his wife in Providence; and the case of Jordan, who killed his wife in Somerville. In both of these cases it was considered necessary by the physician who testified as to the psychic epilepsy, to establish a history of previous epileptiform attacks during early life.

Dr. Baldwin should consider it very remarkable for psychic epilepsy to come on late in life without a history of previous epileptiform attacks. The first period of sickness occurred with this patient when he was twenty-seven years old, and there has been no history of any attacks of epilepsy occurring in earlier life or of any epileptiform attacks occurring since his sickness began. In order to establish the diagnosis of psychic epilepsy in this case, it is necessary to have such a history established.

Dr. Abbot said failure to make the diagnosis of psychic epilepsy in the first attack was almost inevitable. On the first admission to McLean the case was called an Undiagnosed Dämmerzustand.

The tremor of the legs observed by Dr. Prince suggests that the patient may have had other attacks not observed. Féré reports tremors sometimes so slight as not always to be noticed, but which are demonstrable by a recording apparatus.

How much the shocks had to do with the patient's coming out of some of his attacks is difficult to say. It was five hours after being told of his mother's death, and eight after his jumping from the window that he regained his normal condition. Dr. Abbot would doubt if the physician's threat was the real cause of ending the attack in question. He agreed with Dr. Prince that we do need to distinguish between the somnambulistic conditions in hysteria and in epilepsy. He had hoped that this case might bring out some of the differentiating traits. Hysteria was to his mind preëminently a condition of partial or focal dissociations, in any of the psycho-sensori-motor fields. In this case, at least in the one attack in which Dr. Abbot saw him, there was not a focal dissociation but a general diffuse dulling of the whole psychoneural mechanism; and this he would regard as a fundamental differentiating factor.

Dr. Abbot had hoped that Dr. Prince would speak of some complex or some strong emotional shock as a causative factor for the attacks. If through complex indicators or other means a pathway to such shock or complex could have been shown, the memories might have been revived, and the diagnosis of hysteria made more probable. The failure to revive the recollections in this case confirmed Dr. Abbot in the diagnosis of epilepsy.

To Dr. Southard Dr. Abbot would say that whole series of ideas or

groups of thoughts are often suppressed through emotional mechanisms, but he did not call them "unconscious," though they are forgotten, and not always easily recalled voluntarily.

To Dr. Walton he owed apologies for using him as a horrible example. If he used the term *dementia præcox* with a diagnostic significance in the passage he quoted, the other phrases are not so used, and it was to them that he referred.

He speaks of unconsciousness being an essential trait of the epileptic attack. Dr. Abbot had seen a report of a case of epileptic convulsions characterized by strong clonic and tonic muscular contractions and twitchings, with complete consciousness throughout. It was a few years ago, and he had forgotten the reference. His impression is that there was no question as to the diagnosis.

We have, of course, to consider a combination of hysteria and epilepsy. But epilepsy alone will account for all the symptoms in this case,—that is, the patient presented no symptom that may not be seen in the psychic states of epilepsy,—and so it seems that the burden of proof should lie on those who say that some of these attacks were hysterical.

It is comparatively rare for psychic epilepsy to begin late, and this is one of the reasons for reporting this case—its very unusual character. Yet one of the published cases of pure psychic epilepsy began in the vicinity of forty years, without history of previous convulsions. The cases of pure psychic epilepsy that have been reported (judging from a hurried glance through the literature) have not been very fully described, and comparatively little is known about the psychic states that are not associated with convulsions. Some twenty-five or thirty years ago Féré made some very exhaustive studies of the brief states, of fifteen or twenty minutes' duration, following the convulsions.

To answer Dr. Stedman, most cases of psychic epilepsy do show convulsions at some time, and in those, it is not difficult to make the diagnosis. It is in those very rare cases where conclusions do not occur that the difficulty lies.

In regard to treatment, in this case Dr. Abbot would by no means give bromides. Hygienic treatment and the living of a normal life is the best course.

THE NEW YORK NEUROLOGICAL SOCIETY

FEBRUARY 3, 1914

The President, DR. SMITH ELY JELLIFFE, in the Chair

REMARKS UPON CEREBRO-CEREBELLAR DIPLEGIA

By L. Pierce Clark, M.D.

After a preliminary statement of the nature and symptomatology of cerebro-cerebellar diplegia, given in extenso in the author's first paper,¹ he outlined a case illustrating a mild type of the same which was closely allied to Batten's type of congenital cerebellar ataxia. The case was that

¹ "Infantile Cerebro-Cerebellar Diplegia of Flaccid, Atonic-Astasic Type," *Am. Jour. Dis. of Children*, June, 1913, Vol. V.

of a boy of ten whose family history was negative aside from the mother having suffered from a severe shock and an incipient abortion before the birth of the child. The child weighed seven pounds at birth, was puny and delicate; was a restless, crying baby. He walked at three years, with a stumbling, wide, straddling gait, and often dragged his feet. He talked at three years of age, but the speech continued to be stammering, indistinct and slurring. His balance was always poor, and he suffered frequent falls. The boy continued to show dysmetria, ataxia, and hypotonia, which was partially recovered from at the time the speaker's first examination was made last autumn. The boy at that time was slender and poorly nourished, and was about three years under growth. The Simon-Binet test showed that he was about six years of age mentally, but in motor coördination and control was not equal to a child of two years. The physical examination showed extreme flaccidity in all the joints, especially marked in the upper extremities. A series of photographs illustrating the condition was shown. The author reported a great improvement in the hypotonia under the short period of a few months' treatment. The feet were no longer everted, the gait ceased to be straggling, and the dragging of the feet ceased. There was no Babinski; the speech defect had much improved, although it still showed some of the original defects. The degree of mental defect showed that a rather severe cerebral injury existed as well. The author presented the case largely to illustrate the point that probably much of the incoördination of the non-organic feeble-minded may really be dependent upon cerebellar defects as well as a defective cerebral development. He emphasized the necessity of medico-pedagogic training, which would include all the known principles of training treatment for improving cerebellar functions.

Dr. Noyes said that about two months ago a boy ten years of age had been sent to his clinic from the Department of Education, suffering from a certain amount of retardation, a spasticity of the lower extremities, ataxia, an increase of the knee jerks, an exhaustible ankle clonus, a Babinski on one side and not on the other, other reflexes normal. There were choreiform movements closely resembling Sydenham's chorea, but in the opinion of the examiners it was a motor condition secondary to the general condition. He showed a very marked hypotonia of the fingers and elbow joints, but no hypotonia of the lower extremities. The mental condition corresponded to two years' retardation by the Binet-Simon scale, but in general he might be termed an odd rather than a feeble-minded or even a subnormal child. Many tests for mental functions he performed extremely well. His speech was of an infantile type, associated with a deformed palate.

According to the mother, there had been a serious asphyxia at birth, lasting nearly half an hour. He did fairly well during his first years, except in a decided delay in learning to talk and walk. She did not notice any stiffness or staggering until he was four years old. After an attack of scarlet fever at five, this became much more marked, and by seven he showed decided spasticity, ataxia, and mental defect. He never learned to control his bladder or rectum normally until a year ago. The peculiar history of progression suggested Friedreich's disease, even more than Little's disease or diplegia. The extent of the hypotonia almost reached the degree of muscular atrophy of the fingers, suggesting the syndrome of amyotrophic lateral sclerosis.

This case may readily be associated with the cases described by Dr.

Clark. In addition to the obvious diplegia caused by the asphyxia at birth, the hypotonia and ataxia readily suggested a cerebellar lesion, and could be accurately diagnosed as a cerebro-cerebellar diplegia. Like the cases described by Dr. Clark marked improvement in intellect, speech, and gait followed appropriate treatment of massage and tonics.

That a diplegia based upon a combined lesion of the cerebrum and cerebellum should produce exactly such an associated spasticity of the lower extremities and hypotonia of part of the upper extremity is the important point in the paper of Dr. Clark, and to a certain extent it is a new idea to many of us.

Dr. Abrahamson asked if Dr. Clark had made any Barany tests to show the cerebellar involvement. The second important point was the differentiation between lesions affecting the parietal lobes and the cerebellum, to distinguish between stereo-psychic disturbances and affection of the muscle tone, between tactile orientation and tonus orientation. He believed it very difficult to distinguish between them in defective children. The third point that he desired to make was the great similarity between the hypotonia found in these cases and that seen in myatonia congenita of Oppenheim, which resemblance suggested a similar pathology.

Dr. Clark, replying to Dr. Abrahamson's remarks in regard to the possibility of the parietal lobes being at fault in these conditions of flaccid diplegia, said that the suggestion was an interesting one and that the conditions which might be generated as a result of lesions of the parietal lobes might be profitably compared to these cerebellar flaccid states. He had not, however, gone into that phase of the subject, although Thomas's work on the cerebellum and its defects in connection with other portions of the brain had covered the field fairly well. The author said that he had made no observations on Barany's tests in his cerebellar cases and that they would in part be nullified by the very defective intelligence these cases showed, wherein such delicate tests of Barany's called for a good deal of discriminating ability on the part of the patient tested.

As regards Oppenheim's myatonia congenita being akin to the cerebellar state which the author presented, Dr. Clark had taken occasion to point out the analogy and dissimilarity between the two conditions in his first paper, and he had no doubt that cases would still be classed in the one group that belonged to the other, particularly many cases of myatonia would really be found to be of cerebellar character.

In reply to Dr. Noyes's inquiry, Dr. Clark said that the principles of cerebellar control over the muscle tonus were very carefully stated in Thomas's work. He thought that most of the cases in which there was still a good deal of intactness of the cerebral functions had a very fair prognosis, just as Batten had stated of his type. Of course, the main issue in all such disorders is to be relatively certain of the degree and extent of the damage entailed. An effort had been made by Batten to establish six clinical types based upon the degree and extent of injury to the cerebellar functions. Time and more definite information in regard to disorders of the cerebellum, congenital and acquired, would show whether so many designations were really desirable. Undoubtedly Dr. Noyes's case was an anomalous one of cerebral and cerebellar involvement, such as Förster reported upon where spasticities and flaccidities were present side by side in the same case, and undoubtedly quite an extensive theory would be necessary to explain the mechanism in such.

Dr. S. C. Beling and W. P. Eagleton read a paper on "Sellar Decompression."

Dr. Jelliffe said that Dr. Woolsey and Dr. Tilney had been conducting some experiments with the view of attempting to explain some of the results which the Society has had presented before it in regard to the intraspinal method of treating cerebrospinal syphilis. The results which have been reported following treatment by salvarsanized serum, and some of which his own experience could substantiate, were so promising that it was desirable to obtain as much light on the situation as possible.

VITAL STAINING IN ITS RELATION TO CHEMOTHERAPY

By Frederick Tilney, M.D.

Dr. Tilney said that it had been a question in his mind by what avenues the salvarsan reached the nervous tissues, if it got there at all. The theory that salvarsanized serum introduced intraspinaly penetrated into the depths of the nervous system by means of the lymphatics is based upon an assumption in support of which there is little or no anatomical fact. Recalling the facts, that the vital stains in Ehrlich's hands were the basis of chemotherapy, that such stains and salvarsan are closely allied in their chemotaxis, and also that Ehrlich has found trypan red (a vital stain) to be a trypanocide, it seemed justifiable to use these stains on living animal tissue and especially to observe what happens when intravital injections are made intraspinaly, intravenously, intra-arterially, and subcutaneously.

The cat was selected as the first animal to be observed, and the vital stain, trypan blue, used. The first experiment was the injection into the subarachnoid space of $\frac{1}{10}$ of a 1 per cent. solution of trypan blue. Goldmann has experimented with rabbits and has found that these animals when so injected die in three hours, first developing opisthotonos and then passing into coma. Animals Tilney injected showed no such disorder. Upon postmortem, it was found that the dura mater had been stained intensely. The specimens demonstrate this fact better than anything else. The brain itself was stained; in the gross, the tissue seemed to have taken a diffuse stain. None of the other organs of the body was stained. Microscopic preparations showed that the trabeculae of the pia mater extending into the cord and brain as well as the walls of the blood vessels were stained. It is apparent therefore that trypan blue gets into the substance of the nervous tissue along the lines of these trabeculae and by the blood vessels. The ganglion cells and nerve fibers were not stained.

The next experiment was an intra-arterial injection, which showed a marked staining of intestines, liver, spleen, skin, kidneys, and conjunctiva, but no stain in the central nervous system or its covering.

The third injection was made intravenously. The animal was allowed to live for twenty-four hours, as in all the experiments. Here Tilney was surprised to find the dura mater, pia, and pituitary body distinctly stained, although not so intensely as by the intraspinal injection. Frozen sections of this material showed that none of the stain had penetrated into the cord.

The last animal was injected subcutaneously, and while it showed the usual staining of the organs, no region or part of the nervous system showed any stain whatsoever.

It would seem from these limited experiments that we have at least a suggestion that the salvarsan administered intraspinaly reaches the deeper portions of the central nervous system by two very distinct routes,—

first, by the trabeculae extending from the pia mater; and, second, by penetrating the vessels and thus having access to the deeper structures of the cord and brain. Goldmann makes the suggestion that this intravital staining is interesting not only from a histological standpoint, but that it may serve as a medium for carrying in remedial agents. It is proposed to carry out this idea on monkeys and rabbits which have already been infected with spirochetes to see whether the same results may be obtained as were produced from the intraspinal and intravenous injections in the cat.

Undoubtedly the intraspinal introduction of salvarsan seems to be the method of selection, and if the intravenous method is used larger doses must be employed to get corresponding results.

Dr. Zabriskie asked how far Dr. Tilney found his experiments to agree with those of Kramer of Cincinnati.

Dr. Woolsey said that it was his part to carry out the technique of the experiments and he had nothing to add to what Dr. Tilney had said.

Dr. Strauss said that two years ago he had injected a dog with a 1 per cent. solution of collargol into the subarachnoid space, using a fair quantity. The dog lived five or six hours, and then died, probably from the poisoning. To his surprise, he not only found the collargol in the subarachnoid space but in the central canal of the cord. He could not understand this until he saw Kramer's specimen. Dr. Strauss said he thought Kramer used methylene blue, and he likewise found that this substance had gone into the central substance of the cord. Kramer had also demonstrated to him something which he said had been pointed out about fifty years ago, namely, that there is an opening from the central canal outward in the region of the conus.

The interesting feature of Dr. Tilney's experiments is not so much that when he injects trypan blue he finds it going into the brain and cord in that way, but that if he injects it intravenously he finds it in the dura and pia. Granting that it goes there, there is no reason that it should not go further into the cord and brain. That bears out his contention that in all these discussions of the intravenous and intraspinal use of salvarsan those who claim that in giving it intravenously we are not getting it in the central system are in error. Clinical experience and a study of the spinal fluid shows that when intravenous injections are given the drug reaches the central nervous system.

Another point that will be brought up in the future is the work that is being done at present to show whether there is any arsenic in that 12 c.c. of serum taken from the blood. Perhaps it will be shown that there the amount is very minute, perhaps 1/20 of a milligram of arsenic. When introduced into the circulation it becomes fixed so rapidly to the cells that it is not in the blood.

The interesting feature of Dr. Tilney's experiments is that it has been shown that intravenous injections will reach the cord, but large doses are needed.

Dr. Jelliffe, in response to Dr. Strauss's remarks, said that Dr. Kramer did not employ a stain which, like trypan blue, was of the same chemical structure as salvarsan. In other words, aniline blue is a crude aniline stain, as it enters into commerce, and has chemically no affinities with the substances on which Ehrlich built up his salvarsan. Kramer's results, therefore, could not be brought into relationship with the results reported.

Dr. Rosenbluth said that he had had no experience with trypan blue.

but would apply his experience with methylene blue in staining intravital, where the reaction involved is surely chemotactic. The results obtained correspond to the degree of concentration of the dye that reaches the central nervous system, so in routine work with this method it is always important to be sure that the return of fluid from the veins of the injected animal be well colored with the dye, so as to be sure that all of the intracranial vessels are engorged with the dye; and if we wish a more positive elemental stain by this method we actually sprinkle the powdered methylene blue on the living neural substance *in situ*, as first suggested by Cajal; so that the uncertainty of the stain is not due to any uncertainty of chemotaxis but to the uncertainty of bringing the reagent to the tissue to be acted upon. But that the venous route is feasible is shown by the fair proportion of successful stains by this method, especially if one is careful in fully oxidizing by good exposure to the air.

That this is a chemotactic reaction is further demonstrated by the experience of Lawen and Gaza in their experiments in connection with epidural anesthesia, that intraspinal injection of an aniline dye goes as far as the base of the brain but only stains the parts by infiltration and not by circulatory transmission.

Dr. Rosenbluth also wished to report on four patients that had received salvarsan treatment, receiving about fourteen intravenous injections, in whom the cerebrospinal fluid was examined for arsenic and arsenic was found in 80 per cent. of the tests.

Dr. Jelliffe said that arsenic had been found in the central nervous system following the injection of a heterologous serum from another patient. Such patients had not received any arsenical compound other than the serum from another treated patient, and yet this admittedly small amount of arsenic had been sufficient to be determined as arsenic in the cerebrospinal fluid. When it was recalled that even following large doses of salvarsan intravenously no arsenic had been found in the cerebrospinal fluid, it was a matter of possible far-reaching significance that the small amount in a heterologous serum could yet be found in the cerebrospinal fluid.

BARANY'S POINTING TESTS AND THEORY OF CEREBELLAR LOCALIZATION; THEIR DIAGNOSTIC VALUE IN CEREBELLAR DISEASE

By Philip D. Kerrison, M.D.

Barany's Theory.—Barany believes that in the cerebellar cortex there exist definite centers, the functional preservation of which has to do with the individual's ability to move the various joints correctly in certain places without the aid of sight. For each joint, *e. g.*, shoulder, elbow, wrist, hip, knee, etc., there are separate centers exerting tonuses in different directions, *i. e.*, inward, outward, upward, downward. When one of these centers is destroyed or its function suppressed, the joint involved falls under the control of the opposing intact center, and when the patient is blindfolded and the pointing accuracy tested, the affected limb deviates in the direction opposite to that of the tonus of the destroyed or suppressed center. For example, a cerebellar abscess of otitic origin not infrequently suppressed the center exerting an inward tonus upon the shoulder joint corresponding to the lesion, in which case the arm, on

attempting without the aid of sight to point at some stationary object previously located by touch, deviates outward. This is called spontaneous deviation.

Normally, irritation of either vestibular apparatus, *e. g.*, by the caloric test, causes deviation of both arms in the direction opposite to the induced vestibular nystagmus. This is called the normal vestibular reaction. In the case of a cerebellar lesion giving rise to a spontaneous outward deviation, *e. g.*, of shoulder or wrist joint, appropriate vestibular irritation results in the normal deviation, or reaction, in the arm or wrist corresponding to the sound cerebellar hemisphere, but is without influence upon the arm or wrist corresponding to the cerebellar lesion.

Dr. Clark said that the subject of Dr. Kerrison's paper was a very important one, particularly in regard to the whole conception of cerebellar disorders of a chronic sort. It was no longer a point of supposition that the cerebrum may and does take on the function of the cerebellum. Sufficient evidence has been brought forward to show that the frontal and parietal lobes compensate for cerebellar defects to an astonishing degree. One case, carefully selected from the literature, showed that in a man who had died of some intercurrent disease the whole cerebellum was found to be no larger than an English walnut and yet he had no ataxia or incoordination of any sort. This very factor of brain compensation, especially as regards the cerebellum, would complicate Barany's conclusions considerably, as at the present time there is no way of knowing whether one is drawing distinctly upon a defect in cerebellar tonus, or a cerebral defect of the same function. However, the studies were very valuable and in time must contribute much to our symptomatology of cerebellar disease and make the localization of its defects much more definite than now exists.

Dr. Rosenbluth said that in considering cerebellar function it is important to bear in mind the work of Luciani which put our knowledge of the physiology of that part of the nervous system on a firm basis. He very clearly pointed out that the cerebrum took up the functions, in part, of the cerebellum, as evidenced by the abolition of these activities by destruction of the cerebrum when all of the effects of the cerebellar disturbance had to a degree disappeared. In discussing the cerebellum, one should never forget the wonderful work of Luciani, which is one of the landmarks in definition of its relation to general neurological function.

Dr. Tilney said that the work of Barany was of value in confirming the earlier work of Bolk, who attempted to demonstrate the functional localization of the cerebellum on the basis of comparative anatomy. His idea is that the central part of the organ, which he called by a number of complex names, had to do with the coördination of axial and paraxial musculature, including the muscles of the eye, tongue, pharynx, larynx and trunk; the lateral portions of the organ have to do with the appendicular musculature, the arms and legs, particularly in such animals as use these parts in acts which are not bilaterally coördinated. Rynbeck confirmed this localization by animal experiments and came to the same general conclusions as Bolk, both coinciding very closely with Barany in his observations on the human subject. One point might be taken exception to, *i. e.*, "tactile orientation." What Barany appears to mean is tonus orientation. We must remember that we are dealing with a pallio-cerebello complex which affords many possibilities for error in interpretation of symptoms. Indeed, it is a question whether Barany's conception of "tactile orientation" can in any sense be accepted as a definite cerebellar function.

Dr. Timme said that in the last six or nine months Barany had made some interesting experiments upon the students in the University by poisoning them with various drugs, chief among which was alcohol in the form of cognac. This was administered in one dose of 200 grams, and the various tests for cerebellar activity were made a few minutes thereafter, lasting for one or several hours, depending upon the condition of the student. The alcohol naturally depressing the cells of the cerebral cortex as well as those of the cerebellum, mixed effects would of course follow. The general results obtained would take too long to cite here. However, in many cases Barany found a simple exaggeration of the normal outward and inward pointing deviations, a slight change only in the nystagmus, sometimes without vertigo; but of chief interest is the finding that the perception of turning after the turning is completed is much diminished from the normal, so that the tendency to a loss of equilibrium is increased, and to fall in various indeterminate directions is likewise increased. With a normal functioning cerebrum, these perceptions of motion after the motion is over persist longer and so guard the individual against falling. These experiments show the interrelation of the cerebrum and cerebellum.

Dr. Abrahamson said that the pointing test was valuable not only in cerebellar disease but also in involvement of the parietal lobes, as he had been able to observe in two cases of parietal neoplasm. Overreaching occurred in both, but the direction was different, *i. e.*, opposed to each other. Rothmann also had observed this.

Dr. Kerrison, closing the discussion, said that he had nothing to add, and thanked the gentlemen who had followed him for their very courteous and interesting discussion of the paper.

JUNG'S LIBIDO THEORY IN THE LIGHT OF THE BERGSONIAN PHILOSOPHY; WITH ILLUSTRATIVE EXAMPLES

By Bertha Hinkle, M.D.

Dr. Hinkle finds an analogy between psycho-analytical psychology, particularly as Jung has developed it, and the philosophy of Bergson. There has been demonstrated by means of psycho-analytic technique the close relationship of all human life, and that the neurotic and the so-called normal persons are really separated only in their reactions toward life, but not in the contents of their psychic experiences and unconscious tendencies and desires. Instead of regarding the neuroses as entities, they are only individual reactions determined by unconscious regressive phantasies.

The fundamental basis of psycho-analytic psychology is the conception of a primal force existent in humanity, which Jung compares with the conception of energy in physics. This force he conceives of as a living power used instinctively by man in all the automatic processes of his functioning, in his creative desires and interests, the varied processes being but manifestations of his energy. By means of his intelligence and understanding, man can consciously direct and use this power by virtue of its quality of moveableness and flexibility. This psychic energy and driving power inherent in man, in whatever form it takes, is called by Jung "Libido," and will be recognized as similar to Bergson's *élan vital*, or creative energy.

Jung has developed this theoretical conception as a working hypothesis toward the understanding of the varied manifestations of conduct and pathological symptoms having a neurotic basis, for which the sexual theory alone, as expressed by Freud, is not sufficient. Instead of unfulfilled erotic desires and their conflict with the ideals of the personality, he presents the interference, the obstacle in the path of progression of the libido, as the real cause of the neurosis. It will be recalled that this conception of libido is much fuller and broader than Freud's original definition, for while demanding a larger meaning for sexuality than its ordinary sense, he expressly defines libido as a sexual striving and longing, and sees in fixation of the libido at some point in the development of the individual the cause for the later outbreak of the neurosis. From this larger point of view, the question asked is not *from what psychic experience or point of fixation in his childhood is the patient suffering, but what is the present duty or task he is avoiding, or what obstacle in the path of life is he unable to overcome?* What is the meaning of his regression to past psychic experiences and their expression in the form of symptoms?

It is obvious that the struggles of life are a normal and natural condition of humanity, and the degree to which the individual is able to overcome his difficulties, adapt himself, and develop his own possibilities constitutes his degree of normality and vital accomplishment. In a similar vein, Bergson presents the evolution of life into individuals and species as dependent upon "two series of causes, the resistance life meets from inert matter, and the explosive force, due to an unstable balance of tendencies, which life bears within itself."

In the application of psycho-analysis as a therapeutic measure, it is recognized that the individual is capable of doing much for himself, despite unfortunate tendencies or symptoms, and also that unless the patient realizes and understands the determinates of his symptoms and reactions emotionally as well as intellectually, he is unable to gain his freedom from them. Bergson makes a similar statement, which he expresses thus: "An intelligent being bears within himself the means to transcend his own nature," and, again: "There are things which intelligence alone is able to seek, but by itself it will never find. These things instinct alone could find, but it will never seek them."

Sexuality as it so often appears in dreams and phantasies during the course of analysis, can also be symbolic and no more means actual sexual desires than dreams of eating mean a wish for food. If one part of the dream is symbolic, why not the other part? Sexuality stands really for the act of creation, and in the human being this means something besides producing children, the self-creation and creative work of man being ~~equally necessary forms for satisfying~~ his longing. However, the biological method is used by the unconscious to represent this need. It is the inability or failure to recognize this important personal need, and the lack of courage or strength to face the demands of life, which induces the damming up and turning backward of libido, which then reanimates and inflates past psychic experiences and reminiscences, giving them a semblance of reality, and through this mechanism produces symptoms. Thus, the appearance that these phantasies and wishes are the real etiological causes of the neurosis. This is called regression and it is the work of the analysis to free this energy or libido, which is regressively occupied with the past, for application to life and the present duty or task confronting the patient.

This broader and deeper significance of psycho-analytic psychology, as developed by Jung, can be called the practical or empirical side of Bergsonian philosophy, for one complements the other, and the understanding of one leads to the understanding of the other.

Three cases are presented,—an hysterical monoplegia, an involutional melancholia, and an anxiety neurosis, with the meaning of the neuroses worked out through an analysis which demonstrates this etiological conception. All of these cases cleared up in a very interesting manner when they understood the basis of the difficulty and felt its emotional value.

Dr. Jelliffe said that ever since reading Bergson's works he had been struck with the close relationship between the Freudian and Bergsonian attitude of mind. Bergson's conception of the unconscious was practically identical with that of Freud, and he had found that the two concepts were so much alike that they could be used interchangeably in psycho-analytic work. In that masterly description which Bergson gives of what constitutes our unconscious and what our conscious, he says that "duration is the continuous progress of the past which gnaws into the future and which swells as it advances. And as the past grows without ceasing, so also is there no limit to its preservation. Memory, as we have tried to prove, is not a faculty of putting away recollections in a drawer, or of inscribing them in a register. There is no register; no drawer; there is not even, properly speaking, a faculty,—for a faculty works intermittently, when it will or when it can, whilst the piling up of the past upon the past goes on without relaxation. In reality, the past is preserved by itself, automatically. In its entirety, probably it follows us at every instant; all that we have felt, thought, and willed, from our earliest infancy is there, leaning over the present which is about to join it, pressing against the portals of consciousness that would fain leave it outside."

This partial description of what constitutes the unconscious is particularly illuminating because it serves to emphasize the Freudian point of view that nothing in our past is trivial; and Jung's concept is only another way of describing just how this past becomes classified in the mental machinery. The chief complex constellations clustering about the hunger and love impulses are arranged according to a series of mechanisms, which the Freudian psychology has so aptly attempted to formulate.

Furthermore, Bergson goes on to say that: "The cerebral mechanism is arranged just so as to drive back into the unconscious almost the whole of this past, and to admit beyond the threshold only that which can cast light on the present situation or further the action now being prepared,—in short, only that which can give *useful* work. At the most, a few superfluous recollections may succeed in smuggling themselves through the half-open door. These memories, messengers from the unconscious, remind us of what we are dragging behind us unawares. But, even though we may have no distinct idea of it, we feel vaguely that our past remains present to us."

Nowhere can one find so apt a description of what the features in hysterical or compulsive thinking are which produce those symptoms which are usually thought of under these symbols. What Bergson calls "the superfluous recollections which succeed in smuggling themselves through the half-open door," are those which, as is well known, interfere with the smooth working of the activities of that application of the libido which we call "consciousness." These are the disturbing factors which psycho-analysis has so wisely investigated.

Finally, to quote again, what Bergson says: "What are we, what is our *character*, if not the condensation of the history that we have lived from our birth,—nay, even before our birth, since we bring with us pre-natal dispositions? Doubtless we think with only a small part of our past, but it is with our entire past, including the original bent of our soul, that we desire, will, and act. Our past, then, as a whole, is made manifest to us in this impulse; it is felt in the form of tendency, although a small part of it only is known in the form of idea. We get from this last series of word pictures ample justification for the Freudian point of view concerning the value of the affective life, in the study not only of the average individual but of those who vary from the average to such a degree as to show disharmony of mental activities.

The affective life, possessing as it does the old heritage of the past, is of far greater importance in determining our activities than the comparatively late development which we call intelligence. At the same time, nothing is so calculated to impress the mind with the great importance of the affective life as Bergson's description of the mutually interacting forces of intelligence and instinct, and only the naïve intelligence that approaches mental problems from the standpoint of Topsy in "Uncle Tom's Cabin," who just "specks she growed," can fail to be impressed with the tremendous complexity of the psychical reactions, and to realize that the heretofore utilized methods for their study have been inefficient and superficial.

Dr. Oberndorf said that he had enjoyed Dr. Hinkle's clear presentation of Jung's position. However, there seemed to be very little difference between Jung's conception of libido and that previously enunciated by Freud. What Jung has called a "regression" of the libido is a mechanism which Freud pointed out in his analysis of a case of paranoia. In this, Freud attempted to demonstrate that the paranoid ideas resulted as a projection of an unrequited unconscious homosexuality, and that in such cases the libido retrogresses to the homosexual plane. Such a mechanism occurs when the individual encounters untoward circumstances in his life, just as Jung has reiterated, but Freud attempts to trace the retrogression of the libido back to a fixation point in infancy.

Dr. Hinkle has mentioned the value of analysis in enabling the patient to regulate his energy. Certain complexes exist in each and every one of us, unconsciously influencing our actions, which, when brought to full consciousness, no longer annoy or hamper us, and thus increase our efficiency. In fact recently, a stenographer, whom one could not call a "patient," but who had been previously treated for a minor disorder along analytic lines, wrote him that she wished to undergo further analysis, though she had no active symptoms, "merely as a matter of common sense and business," as she thought that money invested in analysis would help her keep her present position, which she had already held for ten years, but which was becoming irksome to her. This is the first time in his experience that a person who was not ill has applied for analysis, but it seems to be perfectly rational and quite in keeping with the dictum of the Zurich school, that any physician before analyzing others should himself submit to analysis.

In Dr. Hinkle's first case, Dr. Oberndorf thought that the child's manifestations toward the mother very possibly had some connection with her relation to her father, on which Dr. Hinkle did not touch. In the second case, the homosexuality which Dr. Hinkle mentioned had not been traced to a point of fixation. In this case, Dr. Oberndorf said he sup-

posed, in view of the close relationship which often exists between life and death, between pregnancy and suicide, in the minds of many individuals, that the suicidal attempts might have represented a wish for pregnancy. With the very close mother identification which Dr. Hinkle had pointed out, it would seem reasonable to suspect that a strong desire for emulating the mother, even in respect to childbirth, existed in this spinster, and that this desire became converted into suicidal attempts after the patient had passed the menopause.

Dr. Hinkle, closing the discussion, said that she had nothing to add to what had been said in the paper, excepting to reply to Dr. Oberndorf's inquiry regarding the factor of jealousy of the mother because of a wish for the father in the monoplegic case, and a wish for pregnancy on account of the mother-identification in the melancholia case. She had found nothing to substantiate such an idea, although the possibilities of those phantasies had not been overlooked; and even if found, they would not in these cases alter the interpretation of the problems as outlined.

NEW YORK NEUROLOGICAL SOCIETY

MARCH 3, 1914

The President, DR. SMITH ELY JELLIFFE, in the Chair

DIASTEMATOMYELIA OF HENNEBERG

Dr. Jelliffe showed a series of microscopic slides of spinal cord sections illustrating this form of spina bifida. Irregular or abortive types of reduplication of the cord were fairly well known, and in these sections the reduplication was well shown. So far as the work of Sibelius was concerned, we had here a fairly good confirmation of his view regarding the development of the horns of the cord, and the forms of the relative types in cases of this kind.

ANGIOMA OF BRAIN

Dr. Jelliffe also showed microscopical specimens obtained at autopsy. The case was one of epilepsy of long standing, with the final development of the status epilepticus and death, and the anatomical finding of an angioma of the frontal lobe. This case was described in detail by Dr. J. Sweasy Powers of Berlin in *Alzheimer and Lewandowsky's Zeitschrift*, Vol. XVI.

PARALYSIS AGITANS: MOTOR PATHOLOGY

Dr. Jelliffe also presented a series of serial sections from a case of paralysis agitans which illustrated the paucity of the fibers in the internal capsule, especially in that group of fibers which were derived from the development of the cerebello-rubro spinal system. There were a sufficient number of slides to show the incompleteness of the fibers on one side of the internal capsule. This finding, the speaker suggested, bore upon the development of the present-day study of tremors and irregular motor reactions, such as were found in multiple sclerosis, Huntington's chorea, the lenticular degeneration of Wilson, and the group of anomalous motor phenomena which had been studied for a number of years and were now regarded as due to disorder or defects in the extra-pyramidal tracts.

Dr. I. Abrahamson said that cases of tumor of the mid-brain involving this region might show a tremor resembling that of paralysis agitans, but it was decidedly coarser and had greater amplitude, almost like a caricature of that of paralysis agitans.

Dr. Jelliffe said the statement made by Dr. Abrahamson opened up the entire subject of our attitude towards this group of disorders. When we used the term "typical paralysis agitans," the question at once arose, was there such a thing. The condition rather represented a syndrome, a group of symptoms, which, when they came together, we theoretically regarded as paralysis agitans. What we regarded as paralysis agitans was more or less of an arbitrary concept.

Dr. Charles L. Dana said that according to his experience with paralysis agitans, about 90 per cent. of the cases showed the same method of development, they pursued the same course, had the same symptoms and the prognosis was about the same. If this combination did not constitute a clinical type, then the speaker said he was at a loss how to describe one.

Dr. Jelliffe said that in the study of the heredity of Huntington's chorea three distinct trends had been found, namely, the motor phenomena, the mental phenomena and the age factor. These trends might appear in different families, but when the three occurred in the same individual, then a typical situation which might be termed Huntington's chorea was present. The speaker said he regarded paralysis agitans in much the same light; that it represented a syndrome or combination of factors rather than a clinical entity.

Dr. I. Strauss showed an instrument for lumbar puncture which he had employed for several months with entire satisfaction. He had found the old style needle rather unreliable, and this instrument contained certain modifications by which the flow of spinal fluid could be regulated.

ANALYSIS OF SOME SUBSTITUTION REACTIONS

By C. P. Oberndorf, M.D.

The speaker said that in 1909 Lowenfeld discussed a topic to which psychiatrists had hitherto devoted little attention, namely, those dream-like states in which, as he said, "usual impressions, customary sights and occurrences appear altered to the patient, as though they were unknown, strange, or the product of phantasy, and in which the patient feels as though he were in a dream or half asleep, hypnotized or moving in his sleep." Abraham, approaching this phenomenon from an analytic standpoint, had differentiated three stages of dreaminess, the first of which was dependent upon a phantastic trend of thought; the second, upon an alteration in consciousness, and a further, third stage of emptiness of consciousness which the patient may designate as a standstill of thought. He concludes, as the result of several carefully studied cases, that these states often represent a substitutive activity for masturbation which has been discontinued.

Most of the patients in which such symptoms appear, Dr. Oberndorf said, belonged to that class of neurotics who began masturbation early in childhood, and who later engaged in an unrelenting struggle to overcome the tendency. Although failure repeatedly attended their efforts to relinquish the habit, various expedients, some psychical, some physical and others again punitive, were invoked to prevent sexual excitation, and more

especially ejaculation. Not infrequently such a struggle resulted in an ostensible conquest of the habit, and all physical manifestations might vanish, but unconsciously a demand for some substitution to satisfy the irrepressible libido persisted. This conflict between the wish and repression unconsciously found a solution in the form of a compromise, but the significance of this substitution compromise was either not recognized by the individual, or, if its true nature was suspected, it was either condoned as being less pernicious, or welcomed as being less obvious to outside observers. The substitution reaction was then permitted to proceed unrestrained until it interfered with the individual's normal activities or attracted the attention of his environment as being an abnormality.

Dr. Oberndorf then gave a brief analysis of three cases coming under his observation to illustrate the transition to and substitution of dreamy or abstracted mental states, which in two of the cases had been almost conscious, in the process of relinquishing masturbatory activities. The speaker said that whether or not one agreed with the interpretation of the mental states in these cases, they at least indicated that mere elaborate description of these or other neurotic conditions was insufficient without some effort on the part of the neurologist to grasp their origin and explain the motive forces and stipulations which they served to represent.

Dr. I. Strauss said that in one of the cases reported in Dr. Oberndorf's paper, the girl who had been in Dr. Sachs' service at Mt. Sinai Hospital and who was afterwards treated in the out-door department, the improvement that followed this method of treatment was certainly very marked. In fact, the parents considered the child well.

Dr. Jelliffe said that in both his private and dispensary work he saw many cases similar to those reported by Dr. Oberndorf, and in the histories they gave he had been struck by the appalling prevalence of cases that had been subjected repeatedly to all the various strictly up-to-date diagnostic procedures, such as X-ray examinations, blood cultures, examination of the gastric contents, etc., etc., until he was led to reiterate the remark of Dejerine, "Has any one taken the trouble to find out anything about your mental life?" In many of these cases, after a five minutes' talk, the outlines of their mental conditions were laid bare. The trouble in most of these cases did not lie in the intestinal tract, and the speaker said he had utterly failed to trace any connection between their symptoms and an overloaded colon or a gastro-intestinal intoxication, nor could he comprehend how an elaborate X-ray examination or prolonged chemical tests of the various secretions had anything to do with the mental phenomena which were frequently such a striking example of a mental or psychical conflict which lay at the bottom of the whole difficulty.

THE RELIEF OF STATES OF HIGH VASCULAR, MUSCULAR AND MENTAL TENSION

By William J. M. A. Maloney, M.D., and Victor E. Sorapure, M.D.

The authors stated that according to James and Lange, an emotional state was consequent upon a physical state; that the latter was the immediate source and precursor of the emotion. According to this theory, which was well substantiated, fear developed because our heart quickened; our heart did not quicken because we feared; the tachycardia was the cause of the fear; the fear resulted from the tachycardia, and we feared

because we breathed rapidly and irregularly; we did not breathe rapidly and irregularly because we feared; the hurried, shallow, gasping respirations caused the fear; the fear resulted from the hurried, shallow, gasping respiration. Fear without visceral change could not occur. Absence of visceral change implied absence of emotion. To minimize visceral change was to minimize emotion.

Deep breathing slowed the heart's action. The changing of hurried, shallow breathing into slow, deep breathing, and the reducing of the heart's rate mitigated or dispelled fear. So long as the breathing was controlled and the heart slow, no considerable fear nor excitement could exist. Every emotion, every thought was externalized in muscular action. Vierordt showed that in the erect posture, the greatest degree of voluntary immobility of any person was accompanied by definite oscillation of the head. He further showed that if a person, standing as motionless as possible, expected to hear something on the right side, the whole body took up a new axis of movement; the whole body now swayed to the right. If the sound was expected from the left, the whole body swayed to the left. Numerous experiments corroborated this, and proved beyond doubt that changes in our stream of consciousness were partly externalized as muscular action. Hence, the attitude of the ataxic was partly an emotional expression—an expression of his uncertainty and fear. Complete muscular relaxation therefore promised still further to tranquilize the anxious tabetic, and, in addition, afford an unconstrained musculature receptive to education in normal movements.

Dr. Maloney said he had elaborated for the relief of states of mental and muscular tension certain depressor exercises, which he used as an introduction to the treatment of ataxia by the blindfold method. In tabetics who were practising these exercises he had observed a fall of blood pressure, and the patients had reported to him that at home the exercises often led to sleep. He next observed that in a case of chronic nephritis the exercises led to a fall in the blood pressure from 220 to 192 mm. in fifteen minutes. He communicated these observations to Dr. Sorapure, who soon verified them in over forty cases and then instructed several physicians in the exercises. These in turn reported equally good results. Altogether, over 300 observations had been made, and in more than fifty cases the effect of these exercises had been studied.

The exercises might be divided into two groups: breathing exercises and relaxation exercises.

Breathing exercises: As we seldom used effort to expire, and often needed effort to inspire, expiration, throughout life, was to a great extent a passive, mechanical act, whereas inspiration more often was consciously performed. So inspiration was usually better controlled than expiration, and much of the trouble in teaching breathing exercises lay in training patients to govern their expiration. They first instructed the patient to breathe deeply and to pause at the end both of inspiration and of expiration. The breathing should be abdominal and should be done without jerking. One of the purposes of deep breathing was to distract the patient from obsessing thoughts and disturbing ideas; to focus his attention upon the exercises. But deep breathing quickly tired patients. Therefore, after about twelve full breaths, the patient was allowed to pass to breathing of moderate amplitude. Now all imagery was discouraged. The patient was asked to feel only the passage of air through his nasal cavities and the tactile sensations which arose from the movements of the abdominal

wall against his clothes. While he was so practising, he was cautioned to keep his attention upon the sensations which accompanied his breathing.

After a few minutes of "medium" breathing, the patient was taught to breathe quietly, and to attend only to the accompanying sensations. A bag of sand or shot or other heavy object placed upon the abdomen was useful to increase the muscular effort involved in breathing, so that breathing, during the exercises, might not easily lapse into an unconscious act. Instead of the sand bag, the physician's hand may be used.

Relaxation exercises: To relax the muscles, passive movements in which the muscles were alternately lengthened and shortened, were employed. The scalp, forehead, cheek and jaw muscles of the recumbent patient were passively moved by the physician, and this was continued until wrinkling diminished or disappeared and muscular spasm was eliminated. Next, a shoulder was relaxed; then an arm. Each was dealt with separately. Each joint was passively moved until all trace of muscular tension vanished. All movements should be first passively made by the physician, and then, where possible—limbs, head and trunk—passively induced by the action of gravity.

The effects of breathing and relaxation exercises: Besides the tranquilizing of excited and anxious states, and the general relaxation of the musculature, certain other physiological effects resulted. During the exercises, a high blood pressure almost invariably fell. Not only in organic renal diseases, but also in cases of high blood pressure in which no renal disease could be detected, a fall occurred. A reduction of from 25 to 30 mm. in the systolic blood pressure, as a rule, resulted from the exercises, and even greater reductions occurred. This fall in blood pressure was observed not only in cases of high pressure, but also in normal people, among whom a fall of from 10 to 15 mm. was customary. The fall, as a rule, affected almost equally the systolic and the diastolic pressure in normal people, and sometimes there was an equal fall in the systolic and diastolic pressure in persons with organic disease, but in those in whom the blood pressure was abnormally high, the systolic usually fell to a greater degree than the diastolic.

Psychologically, the exercises produced concentration of attention and restriction of consciousness. The physiological effects were relaxation of the voluntary muscles, diminution of muscular reflexes, slowing of the pulse rate, a tendency to reestablish in the pulse the normal rhythm in time and volume, lowering of blood pressure, and a tendency to restore the normal pulse pressure. The exercises should last about twenty minutes, at first. If they were continued longer, the patient grew restless.

Therapeutic Applications.—These exercises were originally devised as an aid to the reeducation of the ataxic tabetic. Obviously, they were applicable to all cases in which the relief of high vascular, muscular or mental tension was desired. They were therefore taught in cases of high blood pressure, of muscular spasm, of insomnia and other neurasthenic symptoms.

Dr. Walter Timme said the paper presented by Dr. Maloney began on the basis that the rapid heart action produced the fear. Personally, Dr. Timme said, he did not think that theory was susceptible of proof, but rather the converse. For example, if we took a cat and gave it sufficient atropine to diminish the auto-activity that had control over the heart's action, a sudden fright would fail to produce rapid heart action, but still the animal would be frightened. Fright may produce blanching of the

skin and diarrhea due to stimulation of the autonomic nerve ends. In other words, the results of two factors were interwoven—the two factors being the sympathetic and the autonomic systems.

Referring to the blood pressure, the speaker said that while in certain cases its reduction might prove beneficial, in other cases the high blood pressure may be compensatory, and its reduction would prove injurious. With a productive inflammation of the kidney a high blood pressure was a purposeful action, and by reducing it the kidney could not functionate properly. With functional conditions, of course, the reduction of a high blood pressure was beneficial, but to attempt to reduce it below its physiological limits was of doubtful efficacy. However our thanks are due to Dr. Maloney for giving us a method which promised so much in the relief of high tension cases of functional character, for it is just in these cases that a lowered tension is of lasting benefit.

Dr. Richard B. Kruna said he had employed exercises similar to those described by Dr. Maloney in the reëducation treatment of infantile paralysis for the past eight years. He had also resorted to them in the treatment of cardiac neuroses, in conditions of disturbed innervation of muscular tissue, of increased muscular activity, such as we found in convulsive tics and in neurotic tachycardia, and he could subscribe to the fact that by this method we could establish greater regularity of the heart's action, and that in infantile paralysis it improved the innervation of the muscles that were affected by the paralysis springing from certain segments of the cord.

Dr. Jelliffe said he was glad that the authors of this paper, Dr. Maloney and Dr. Sorapure, had emphasized the value of the psychical element in connection with this method of treatment. He believed, however, that they would have to relinquish their contention that fear was consequent upon the quickened heart's action. If anything had been shown by the recent work on the sympathetic nervous system, it was that the James-Lange theory failed fully to account for these phenomena, and that after all we were not afraid because our hearts beat, nor did our hearts beat because we were afraid, but that these phenomena were the result of anterrellatory phenomena operating through the sympathetic and the autonomic nervous systems, using these terms as Eppinger and Hess had outlined.

Dr. Maloney, in closing, replying to Dr. Timme, said there was no evidence to substantiate the theory that the kidney functionated less actively under conditions of lowered blood pressure. At all events, the idea of bringing the pressure down to a danger point in nephritis did not enter into this discussion. In their cases they had noted that the systolic pressure was always lowered to a greater degree than the diastolic, and it was only in the functional conditions that a considerable fall in both the systolic and diastolic occurred.

Translations

VAGOTONIA

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER AND DR. LEO HESS
OF VIENNA

TRANSLATED BY WALTER MAX KRAUS, A.B., M.D., AND
SMITH ELY JELLIFFE, M.D., PH.D.

(Continued from p. 400)

Lungs and Respiration.—The classical example of vagus stimulation in man is bronchial asthma. This, according to the prevailing opinions, is due to a spasm of the bronchial musculature. A substantial support of this view is the beneficial effect which atropin and adrenalin have upon the condition. The production of the symptoms of bronchial asthma may be explained as follows: Due to an overirritable state of the vagus, even small stimuli acting upon it may produce spasm of the bronchial musculature. The result of this is that the alveolar air cannot be forced out as readily as normally by the elastic fibers and the condition of "passive" spasm, with the result that an excess of air remains in the alveoli. Furthermore the autonomic stimulus produces not only muscular spasm, but also increased secretion from the bronchial mucous membrane, an added hindrance to expiration. An argument in favor of this conception of the part played by the vagus is the action of adrenalin. This diminishes the bronchial secretion with the result that the spasm seems to pass away.

It is more difficult to understand a condition of increased vagal tone in connection with the lungs. However the following experiment may be taken as an example of the existence of such a condition. If an individual breathes in a Bohr respiratory apparatus, the following may frequently be observed. After a deep inspiration and a deep expiration have been taken and after the patient has again resumed quiet respiration, the curve does not

drop to the previous level at once but with a slow and step-like fall.

Individual variations play a part in this, as Hofbauer has pointed out, and these variations are due mainly to the expiratory muscles [the abdominal press]. It is noteworthy that after atropin the curve sinks much more precipitously, and there is no step-like formation. This, we believe, is to be explained by an increased tone in the vagal branches of the lung, causing narrowing of the bronchial musculature, so that an excess of air in the alveoli cannot be so readily expressed through the elastic elements of the lung. Later, this condition will be considered in connection with the occurrence of juvenile emphysema.

Strümpell's¹⁰ observation that narrowing of the glottis may occasionally complicate asthmatic attacks is of importance in connection with our observations upon the relation of bronchial asthma to vagotonia. It seems particularly significant when one considers that the recurrent laryngeal nerve is a branch of the vagus. This leads to the question whether or not spasm of the glottis [laryngospasm] may not be a result of some irritability of the tone of the rima glottidis. We have noted elsewhere the significance of laryngeal crises as states of autonomic irritability. In this connection it may be added that the dependence of laryngeal crises upon an increased tone in the musculature of the vocal cords is made clearer by the observation that in tabetics, who have a tendency to laryngeal crises, simple movement of the laryngeal passages may suffice to bring on an attack.

A frequently observed condition in vagotonics is respiratory arrhythmia. Patients often complain of a feeling of inability to expire. If tracings of the respiration of such individuals are made by a Hofbauer pneumograph, variations in respiration of varying duration will be found. In this way one may discover disturbances of respiratory rhythm which cannot be detected by mere inspection or even by closer study.

The variations manifest themselves graphically as incomplete expirations and inspirations following closely one upon another, so that the respiratory curve sometimes falls, sometimes rises. The respiration may also show pauses of varying duration. But one must take care not to confuse these arrhythmias with those produced by swallowing movements. Atropin will eliminate these

¹⁰ Med. Klinik, 1910.

irregularities, while pilocarpin will either bring them to light or aggravate them. We have noted beautiful examples of these arrhythmias during tabetic crises and in cases of vagotonic Graves' disease.

The relations between respiration and circulation may also show variations from the normal in vagotonics. There are definite variations in blood pressure and cardiac action dependent upon expiration and inspiration. In young people these variations may be considered to be normal. They consist in an acceleration of the pulse rate during forced inspiration which changes to slowing at the height of inspiration. Without entering into a discussion of the etiology of this phenomenon, we may say that it is eliminated by the use of atropin. This form of irregularity is designated *pulsus irregularis respiratorius* and, as has been stated, is particularly frequent up to the age of fifteen. When it occurs after this age and is to any degree marked it must be considered as a symptom of vagotonia. The infantile type of pulse, in Mackenzie's sense, is similar. It consists of shallow pulsations followed by deep excursions, that is, the individual beats are of unlike intensity. Respiratory variations from the normal may occur with this. As in *pulsus irregularis respiratorius*, atropin will relieve the arrhythmical condition.

Stomach.—The influence of the vagus upon the stomach may be considered in three parts: the influence upon tone, peristalsis and secretion.

The newer experiments [A. Müller] have shown that the tone of the stomach is dependent upon the substances which enter the stomach at the same time that food enters. The stomach normally is not dilated, but dilates actively in proportion to the degree of filling, thus causing the muscular elements to cover the contents closely. Tone is therefore a resistance to filling. This resistance may be increased by the activity of the vagus, or by drugs which have a stimulating influence upon the autonomic system. While the atonic stomach reacts very readily upon ingestion of food, this same food must contend with a great deal of resistance in the hypertonic organ, a resistance which disappears but gradually. The progress of this disappearance may be followed very satisfactorily in man by means of X-ray examinations. Bräuning¹¹ was the first to show that the bismuth meal does not sink at once along

¹¹ Bräuning, Münch. med. Woch., 1909, 20.

the lesser curvature of the stomach to the antrum pylori, but is held back for varying lengths of time in the fundal parts of the stomach [see Fig. 2]. In some people it may be seen that the food is gradually forced out of the fundus, this part taking the form of a narrow canal which is but gradually expanded. The whole process would seem to be an economizing of space. If more food comes down through the esophagus, the fundal part fills up to a greater degree than the pars intermedia is gradually distended, and finally the bismuth is seen to have passed into the antrum pylori. In most instances a powerful wave of peristalsis is set up in the pyloric region when the food enters it. If the entire stomach is filled, as just described, a process which often takes several minutes, the form of that organ is called the "cow-horn" form, as described by Holzkecht. This gradual filling of the stomach may occur in quite normal individuals who complain of no stomach trouble whatsoever. Should the resistance of the stomach musculature be lacking, its tone will play but a small rôle, and the food will fall directly into the lower pole of the stomach which under these circumstances will be "book-shaped," a term also introduced by Holzkecht. It is very significant that the first form of filling of the stomach, that leading to the "cow-horn" shape, is most frequently seen in vagotonic individuals, so that we may suggest for it the designation vagotonic form of stomach. Mention must be made at this point that Holzkecht has stated that this form of stomach is more frequently found in young individuals than in adults. It is certainly striking when the vagotonic form of stomach occurs in individuals with flabby abdominal walls in whom one would expect posed and atonic stomachs. This occurs chiefly in women who have borne children frequently and in whom the supporting apparatus for the stomach tone is lacking, for when the abdominal pressure is decreased there is almost always a decrease in the tone of the stomach. If under such circumstances a vagotonic form of stomach is found, the probability of increased vagotonia is all the greater, since one would expect the "book-form" stomach instead of the "cow-horn" vagotonic type.

It is known that gastric peristalsis is increased by pilocarpin and physostigmin, while small doses of atropin inhibit it. Furthermore, a physiologically increased peristalsis would indicate an increased tone of the autonomic system. But it must be stated

that increased tone and increased peristalsis do not always go hand in hand, since there are stomachs with but little tone in which a powerful peristaltic action may be observed.

Hypersecretion as well as hyperacidity are traceable to stimulation of the vagal nerve supply of the stomach. Here it becomes necessary to differentiate between latent increased tonus and paroxysmal increase of the secretory activities. If we find in a vagotonic person very marked hyper-acidity, reaching double the amount of the normal, and find that in spite of this the person makes no complaint, it is justifiable to conclude that this increased production of juice is dependent upon increased tone, upon some physiological stimulus. If the increased production of juice is accompanied by attacks of pain, we have the well-known picture of intermittent gastric secretion, a disease whose nervous etiology is generally recognized. There are many forms of increased glandular activity since hyperacidity and hypersecretion may be found together, or either one may be found alone.

The highest grade of apparently lasting stimulation of the gastric vagus is gastrosucchorhea [Reichmann's Disease], in which the tone, one might almost say the spasm, may reach such high limits that the usual doses of atropin have no effect. Pylorospasm is most often accompanied by hyperacidity. The spasm of the circular pyloric musculature, which is the underlying cause of pylorospasm, may reach so great a degree that not only is the passage of food into the duodenum made very difficult, but even waves of antiperistalsis may occur. This fact, which may be confirmed by X-ray examination, is important since antiperistalsis is so generally referred to some organic disease in or about the pylorus. As a means of differentiation, atropin may be tried, since this will check the pylorospasm as well as the antiperistalsis—clinically pyloric stenosis may be *caused* by spasm of the sphincter pylori. When these stomachs are examined radiographically, the previously mentioned physiological picture of increased folding of the gastric musculature is so much intensified that one may get a condition like that of the hour glass stomach dependent upon organic changes. Here also atropin may be used to advantage.

(To be continued.)

Periscope

Revue Neurologique

(Vol. XXII, No. 1, January 15, 1914)

1. Centralobar, Symmetrical, Intracranial Scleroses, Paraplegic Syndrome. P. MARIE and CHAS. FOIX.

2. "Psychiatry." Has it a satisfactory Terminology? CHASLIN.

1. *Symmetrical, Centralobar Sclerosis.*—A patient who at the age of eighteen years became, in the course of fifteen days, completely quadriplegic with loss of power of speech. After about two months speech returned and in six months gradual improvement began in the limbs. The right arm improved considerably; the other three extremities remained partly paralyzed and extremely rigid. The tendon reflexes were exaggerated and there was a positive Babinski on the left, doubtful on the right. Sensation was normal. Vision was normal and the pupils reacted well to light. Death was due to pulmonary tuberculosis. The lesion in the brain consisted of symmetrical areas of sclerosis in both cerebral hemispheres, involving the white matter beneath the upper portion of the ascending frontal convolutions, the upper portion of the parietal lobes and almost all of the occipital lobes. It was composed of overgrowth of neuroglia and a demyelination of the nerve fibers; some nerve fibers passed through the areas. The edges were fairly well defined and there was very little secondary degeneration. The sclerotic areas in the hemispheres were joined by a degeneration of the splenium of the corpus callosum. The authors find no similar case in the literature.

2. *Psychiatric Terminology.*—One of the great difficulties in psychiatry is the very loose way in which descriptive terms are employed. The author cites a large number of words of which the meaning is uncertain and which are useless as descriptive terms.

(Vol. XXII, No. 2, January 30, 1914)

1. Conjugate Movements. J. BABINSKI and J. JARKOWSKI.
2. Scorbutic Polyneuritis. A. AUSTREGESILLO.
3. The Moriz Weisz Reaction in Mental Diseases. V. DEMOLE.

1. *Conjugate Movements.*—In affections of the pyramidal tract one of the causes of the interference in function is the difficulty in executing simple isolated movements. The flexion of the knee or hip is accompanied by flexion at the ankle (Strümpell's tibialis phenomenon), and the same is true of extension of the limb. Analysis of the different conjugate movements of this sort show that they are to some extent physiologic and are due to the arrangement of the muscular attachments. The effect of the pyramidal lesion is simply to cause a slight permanent contracture which, by augmenting the tension of the muscles, generally, prevents the relaxation of the antagonist which is an essential condition for accomplishing elementary, isolated movements.

2. *Scorbutic Polyneuritis*.—The diagnosis of scurvy from beri beri may be very difficult especially if the scurvy is complicated with multiple neuritis. A scorbutic polyneuritis may be acute or subacute and preserve the general character of a case of scurvy. There is a post-scorbutic form which develops during convalescence and which is very rebellious to treatment.

3. *Moriz Weiss Reaction*.—This reaction is an indication of the presence of urochromogen in the urine due to some metabolic disturbance. After the examination of 139 cases of various mental disorders, it is concluded that the reaction is not a symptom of any one disease but is found in those much debilitated or suffering from grave intercurrent affections.

(An. XXII, No. 3, February 15, 1914)

1. Compression of the Spinal Cord by an Extradural Tumor; Intermittent Paraplegia, Operation. J. BABINSKI, E. ENRIQUEZ and J. JUMENTIÉ.
2. A Rapid Method for Staining Myelinated Fibers, Staining Simultaneously the Cellular Lipoids. A. ZIVERI.
3. Epileptoid Attacks in the Degenerate. G. HALBERSTADT.

1. *Extradural Spinal Tumor*.—The patient was forty-five years old. In 1906, he began suffering with attacks of neuralgic pain in the eighth intercostal space on the right side. The pains would last one or two days and recur at intervals of about two months. About two years later, following a very severe attack, he noticed weakness in the left leg. This weakness disappeared in about two weeks but reappeared after each attack until about a year later, after an attack, the left leg became completely paralyzed and there was loss of pain and temperature sense in the right leg. He recovered completely, but four months later, while walking he suddenly had an attack of pain and both legs became completely paralyzed and remained so for about a month, after which he slowly recovered. When examined in July, 1912, about five months later, his gait was staggering; his left leg was very weak and the tendon reflexes in the lower extremities were exaggerated. There was a positive Babinski reflex on both sides. Reflexes of defense could readily be obtained on both sides up to the level of distribution of the eleventh dorsal segment. There was a hypoaesthesia, more marked on the right side, which extended up to the level innervated by the eighth dorsal segment. The cutaneous distribution of the third, fourth and fifth sacral had normal sensibility. A short time after this examination he had a severe attack of pain and the lower extremities became completely paralyzed and insensitive. There was complete retention of urine. An operation was attempted but the patient died under the anesthetic. At necropsy there was found an extradural tumor, eight centimeters long, extending from the eighth to the eleventh dorsal roots. It was a round cell sarcoma, containing numerous hemorrhages both recent and old.

2. *Rapid Staining Method for Myelin*.—Pieces are fixed in 10 per cent. formalin for three days or longer and sections cut by freezing. The sections are placed in a solution composed of a solution of ferric chloride, one part, and water, four parts for twenty-four or forty-eight hours. After washing thoroughly, they are stained with a 1 per cent. alcoholic solution of hematoxylin, to which has been added an equal part of distilled water and a few drops of acetic acid. Differentiate in a diluted ferric

chloride solution, wash thoroughly, dehydrate in alcohol, clear and mount in balsam.

3. *Epileptoid Attacks in Degenerates*.—The author includes attacks which he thinks differ from epileptic attacks in some essentials; they are provoked by definite circumstances and are not spontaneous, the bromides are not effectual but on the contrary dietetic and hydrotherapeutic treatment is valuable, the mental state is not that of epilepsy and the subjects of these conditions have signs of degeneracy such as tics, phobias, etc. Included in this category are psychasthenic attacks, as described by Spiller; "Affektepilepsy" or, as the author has it, "epilepsy *provoquée* in young degenerates;" and narcolepsy, as described by Friedman.

(Vol. XXII, No. 4, Feb. 28, 1914)

1. Cavities in the Spinal Cord and Cervical Meningitis. JEAN CAMUS and GUSTAVE ROUSSY.

2. Multiple Sclerosis (?) with Alternating Hemiplegia. B. CONOS.

1. *Cavities in the Spinal Cord*.—An experimental study. About 2 c.c. of a mixture of a "fatty" acid, sodium nucleinate and talc suspended in water was injected into the arachnoid space by passing a needle through the occipito-atloid membrane. This caused a chronic meningitis with much thickening of the meninges. In the gray matter there were irregular cavities somewhat resembling syringomyelia cavities. The cavities are probably due to vascular disturbances but an inflammatory origin is possible.

2. *Alternating Hemiplegia*.—The patient, age thirty-nine years, a physician, began vomiting on arising in the morning and at the same time noticed weakness in the left arm and a marked dilatation of the right pupil. Almost simultaneously he began hiccoughing and continued to do so for two weeks. Examination showed a partial paralysis of the right third nerve associated with a left hemiparesis and a crossed hemianesthesia, *i. e.*, the left side of the face and the right arm and leg. Syphilis was excluded by a negative Wassermann reaction on the blood. The author diagnosed a rare form of multiple sclerosis with sudden onset. Malaria may have played a part in the etiology.

(Vol. XXII, No. 5, March 15, 1914)

1. The Use of Spinal and Cerebral Injection of Serum Salvarsanized *in vitro* and *in vivo* in Tabes and in General Paralysis. G. MARINESCO and J. MINEA.

2. The Forearm Phenomenon (of Leri). TEIXEIRA—MENDES.

1. *The Injection of Salvarsanized Serum*.—Marinesco used the serum of patients treated by salvarsan for intraspinal injections in cases of syphilis of the spinal cord and published his results in January, 1911. Later the same method of treatment was used by Robertson and by Swift and Ellis. The direct injection of neo-salvarsan into the spinal canal has been used by Wechselsmann and also by Marinesco and others. Sicard and Reilly injected neosalvarsan directly into the subarachnoid space of the cerebrum in a case of general paralysis, with beneficial results. The authors treated nineteen cases of syphilis of the nervous system by the intraspinal injection of neosalvarsan dissolved in serum of the same patient. Fifteen of these were cases of tabes. In only one case was there a bad result. In two cases of general paralysis, twenty centigrams of neo-salvarsan dissolved in two cubic centimeters of serum were injected into the subarachnoid space over the left frontal region. Both patients had epi-

leptiform attacks following but no other changes in symptoms. In thirteen cases the injection was made in the frontal region on both sides but only ten milligrams dissolved in four cubic centimeters of inactivated serum. In four of these cases there was a slight improvement in the mental state.

2. *Forearm Phenomenon*.—Described by Leri as a flexion of the forearm on the arm when the observer forcibly flexes the fingers and wrist. It is probably an automatism. From the author's investigations he agrees with Leri as to its diagnostic significance. It is positive in the normal state but is absent in organic hemiplegia, in tabes-dorsalis if the cervical cord is affected, in Huntington's chorea and in some cases of epilepsy.

(Vol. XXII, No. 6, Mar. 30, 1914)

1. Basedowism or Vasomotor Neurosis (Vasomotor Disturbance, with Excitable Heart, Nervous Dyspepsia, Tremor and Psychic Troubles.) L. ALQUIER.

2. Study of the Reflexes. NOÏCA.

1. *Vasomotor Neurosis*.—Ten observations of cases in which the symptoms indicated in the title are most pronounced. The mental symptoms were agitation, confusion, anxiety and emotional instability. The dyspepsia was chiefly distinguished by the variability of the symptoms.

2. *Study of Reflexes*.—In an extremity made anemic by an Esmarch bandage the tendon reflexes disappear. When the bandage is removed they reappear in the reverse of the order of their disappearance and are increased during the period of secondary hyperemia. When the knee jerk is absent because of anemia, there develops a contralateral adductor reflex but when the knee jerk returns the adductor reflex disappears. This is interpreted to mean that the normal knee jerk inhibits the contralateral adductor reflex.

(Vol. XXII, No. 7, April 15, 1914)

1. Meningeal Syndrome in the Course of Cerebral Hemorrhage. L. LEVY GONNET.
2. A New Method for Producing Experimental Lesions in the Nerve Centers. A. BERTOLANI.

1. *Meningeal Syndrome*.—The patient, fifty-six years of age, complained of malaise, asthenia and occipital headache on awakening in the morning. During the day the symptoms grew worse and he vomited several times. In the evening he was in coma, with head retracted, slow pulse and Cheyne-Stokes respiration. There was no hemiplegia. The blood pressure was high and albumin was present in the urine. A venesection made him less stuporous but coma soon returned and later convulsions, of the type of Jacksonian epilepsy. The cerebrospinal fluid was a pale yellow and on centrifuging gave a clot composed of 92 per cent. polynuclear leucocytes, 5 per cent. mononuclear and 3 per cent. lymphocytes. Sugar was present in about normal amount and the fluid reacted to Gmelin's test for bile pigment. Urea in the blood was 0.35 gr. per liter. Necropsy showed no meningitis but a large recent hemorrhage in the parieto-temporal region. The hemorrhage did not reach the surface of the brain.

2. *Experimental Lesions in Nerve Centers*.—The method consists in the injection of paraffin with a melting point of 38-40 degrees centigrade, which stimulates the effects produced by cerebral hemorrhage.

C. D. CAMP (Ann Arbor, Mich.).

Journal of Mental Science

(Vol. 57, No. 236)

1. Biochemical Examination of the Cerebro-spinal Fluid in Cases of Mental Disease. HUGH MORTON.
2. Pituitary and Supra-renal Growths in a Case of Insanity. E. BARTON WHITE.
3. The Wassermann Reaction: A More Reliable Technique. WALTER GILMOUR.
4. The Presence in Blood Sera of Substances which have an Activating or Inhibitory Effect on the Hemolytic Properties of Cobra Venom. CHARLES JAMES ROSS.
5. The Comparative Anatomy of the Frontal Lobe, and its Bearing upon the Pathology of Insanity. SYDNEY J. COLE.
6. Heredity and Insanity. T. E. STANSFIELD.
7. The Sterilization of the Insane. E. FAULKS.
8. Periodic Attacks of Excitement and Depression in the Chronic Insane. R. M. MARSHALL.
9. On the Mechanism of Mental Processes with Special Reference to Emotional Control. GEORGE RUTHERFORD JEFFREY.
10. Clinical Aspect and Treatment of Asylum Dysentery. J. R. PERDRAUT.
11. On Insanity and Marriage. G. H. SAVAGE.

1. *Cerebro-spinal Fluid in Mental Disease*.—Morton discusses the methods of obtaining and the examination biochemically of the spinal fluid. He states his conclusions as follows:

(1) Wassermann reaction positive in twenty-eight out of thirty cases of general paralysis, negative in thirty cases of epilepsy and dementia præcox.

(2) The more advanced the case, the greater the amount of complement absorbed.

(3) Fresh cerebro-spinal fluid possesses no activating properties for cobra venom; certain fluids rich in cellular content were found to inhibit the activating power of alcoholic extract of liver; this inhibiting action disappeared when the cellular elements were centrifugalized.

(4) Mixtures of cerebro-spinal fluid and alcohol present varying degrees of turbidity; as a rule the greatest degree of turbidity is seen in cases of general paralysis, but equally turbid mixtures were observed with fluids from cases of epilepsy and dementia præcox in their acute phases.

(5) There is no relationship between the degree of turbidity and the amount of complement absorbed in the Wassermann reaction.

(6) An alcoholic extract of cerebro-spinal fluid when heated and filtered is found to contain substances which produce lysis of ox-corpuscles sensitized with cobra venom. The precipitate does not possess inhibiting properties in a dilution equal to that in which the precipitable substances are present in the spinal fluid.

(7) The strength of this lytic property bears no relation to the density of the precipitate in the mixture of alcohol and spinal fluid, or to the amount of complement deviated by the fluid in a Wassermann test.

(8) No difference between general paralytics and other cases of mental disease could be determined in respect of the content of the extract of spinal fluid in substance which activated cobra venom; it is thus questionable whether the Wassermann reaction is due to substance of a lipid character in the fluid.

(9) Examination of the protein content of the spinal fluid by precipi-

tation with ammonium sulphate, and also by the Noguchi method, showed that there is a close correspondence between these methods of precipitation and the precipitation of alcohol. A few cases of dementia præcox were found with a high protein content, just as they sometimes show a considerable precipitate with alcohol.

(10) There is however, no relationship between protein content of the spinal fluid and intensity of the Wassermann reaction.

(11) In filtering alcoholic or ethereal extract allowance must be made for the fact that certain lytic substances in the filter-paper may be extracted.

2. *Pituitary and Supra-renal Growths.*—White and Scholberg describe a case of "mania with hallucinations" the organic significance of which was not realized until autopsy was performed. The immediate cause of death was lobar pneumonia. The supra-renal bodies were found to be the seat of marked pathological change, the medulla having been almost entirely replaced by blood clot. There was, therefore, a considerable deficiency of the tissue necessary for the supply of the physiological stimulus controlling the arterial tone of the vascular system which might account for the pulse being slow and of low tension, and the temperature sub-normal, although death was due to lobar pneumonia.

The anterior lobe of the pituitary body was considerably enlarged and from certain suspicious appearances of parts of the face noted after death, the final conclusion was that the case was one of early acromegaly associated with mental symptoms.

The paper includes several plates illustrating the pathological findings.

3. *The Wassermann Reaction.*—Gilmour advocates using the emulsion of lecithin-cholesterin instead of the crude alcoholic liver extract. He concludes that the lecithin-cholesterin method is more accurate and effects a considerable saving of time because emulsion of lecithin-cholesterin is much less anti-complementary than crude extract which is excessively anti-complementary. Five tables illustrate this paper.

4. *Hemolytic Properties of Cobra Venom.*—Ross tested sera of various sources among which were cases of dementia præcox, manic depressive insanity, general paralysis, epilepsy, idiocy and imbecility, also cases without nervous symptoms, pneumonia, scarlet fever, enteric fever, phthisis and normal. His own conclusions are as follows:

(1) Human sera vary considerably in the possession of properties which exercise an inhibitory or activating influence on cobra venom hemolysis.

(2) The fact that some sera inhibit and others activate cobra venom does not possess, so far, any clinical significance.

(3) A serum with inhibitory properties can neutralize the effect of a serum with activating properties, but does not neutralize the activating power of lecithin.

(4) Ox serum possesses inhibitory properties similar to those possessed by inhibitory human sera; guinea-pig serum, while possessing strong activating powers when fresh, is strongly inhibitory when heated for an hour at 60 degrees C.

(5) The inhibitory properties of ox serum and guinea-pig serum heated for an hour at 60 degrees C. can neutralize the activating effect of fresh guinea-pig serum.

(6) This neutralization of the activating power of fresh guinea-pig serum for cobra venom does not influence its complementing action on corpuscles sensitized with homologous immune bodies.

(7) Although cholesterin does not neutralize the activating power of fresh guinea-pig serum, this is accomplished by the addition of ox serum or guinea-pig serum heated for an hour at 60 degrees C. It would thus appear as if cholesterin were not the body which exercised the inhibitory influence.

(8) There are thus good grounds for believing that sera do not activate or inhibit in virtue of a lecithin or cholesterin content; and it may be doubted whether true complementing occurs with fresh guinea-pig serum and cobra venom in the sense in which it takes place when fresh serum is brought into contact with an antigen and its homologous immune body.

5. *Comparative Anatomy of the Frontal Lobe.*—Cole examines the proposition of Bolton that in dementia the seat of the greatest wasting of the cerebral cortex is commonly the prefrontal region, regarded by some as a center of higher association, and which in man is one of the last to myelinate. From this it might be inferred that the prefrontal is in man a new region and that wasting in this region in dementia is in accordance with the Hughlings Jackson theory that dissolution follows the inverse order of evolution. From a comparative study of convolitional and fissural pattern in anthropoids, however, the greatest increase in development in the higher types is in that region corresponding to the inferior frontal region in man, and not the prefrontal region. He concludes that while the functions of the prefrontal region may be those as claimed by Bolton yet the distribution of cortical wasting in dementia can hardly be explained upon Jacksonian principles without some reservation.

6. *Heredity and Insanity.*—Stansfield remarks on the great increase in the ratio of pauper insanity in the London asylums, while there has been practically a fall in the ratio of private insanity. He concludes that this is due to a growing appreciation of the important part played by heredity in the causation of insanity by that section of the community which sends private patients, and the ignoring of the fact by the class which sends the bulk of the pauper insane. He calls attention to the importance of obtaining complete family histories, a careful inquiry frequently revealing more than one case of insanity in the family. In his opinion the only remedy for the increase of insanity is sterilization.

7. *Sterilization of the Insane.*—After emphasizing the importance of the adoption of some method of sterilization to counteract the growing masses of certified insane, Faulkes calls attention to the satisfactory results of castration in four cases at the asylum at Wil in Switzerland. The cases were two women, one an epileptic, the other "weak minded," and two men, both sexual inverts, the operation enabling all to live outside of the asylum, and removing abnormal sexual impulses. Cases of masturbation have also improved following the same operation.

After considering several proposals, he concludes that the most reasonable and practicable one is the compulsory sterilization of proposed discharges who are at the moment under certificate for the second or further time. He quotes the law as enacted in 1907 in the State of Indiana, and cites the experience of Dr. Sharp at the Indiana Reformatory.

8. *Attacks of Excitement and Depression*—Out of 247 female patients seventeen were liable to periodic attacks of mental excitement and depression. Marshall examines these and reaches the following conclusions.

(1) Alternating mental states may appear as episodes in the most diverse forms of alienation, imbecility, secondary dementia, organic dementia, paranoia.

(2) They may usher in the clinical entity we recognize as secondary

dementia, completely dominating the clinical picture; or they may appear at any point of its course.

(3) Some clinical criteria—restriction of ideation, intrapsychic ataxia, stereotypes of attitude, etc.—enable us to recognize in many instances the underlying dementia.

(4) Alternating mental states are the clinical expression of an error in the molecular structure of the nerve substance.

(5) Diverse nutritional chemical and dynamic factors may be responsible for this error, and a disease process already at work in the brain may be the source of some of these factors.

9. *Mechanism of Mental Processes.*—Jeffrey objects to the term "neuro-insane diathesis" preferring "emotional diathesis" as more accurate and descriptive. The emotional diathesis may result from a hereditary predisposition, the effects of vicious training or both, or again it may be acquired by long-continued overwork. Gross structural lesions such as occur in embolic softenings, etc., may interfere with the integrity of the mechanism of cerebral association controlling the emotions.

In the normal brain where there are complete and a sufficient number of association tracts, the stimuli pass from the primitive perceptive centers to the secondary areas and a regulated external response is expressed. In the emotional brain, if there is a deficiency in number or an inadequacy of the associated fibers—a state which may be constitutional or acquired—a stimulus sets in motion the primary perceptive centers, but its secondary areas are deficient. There is an unbalanced emotional response.

"It is conceivable that when the resistance between the primitive and the normal secondary association areas is inhibitive, the stimulus may overflow from the primitive perceptive centers along remotely connected areas, and thus produce forms of perverted responses such as are seen in the paranoid forms of insanity.

10. *Asylum Dysentery.*—Perdrau discusses the clinical features and treatment of the apparently ever-present asylum dysentery. Treatment by izal reduced the mortality from 22.1 per cent. which was the average to 17.6 per cent.

11. *Insanity and Marriage.*—Savage has seen a "good many adolescent cases with melancholic symptoms" and a "good number of adolescent cases with maniacal excitement" who have recovered and married remaining healthy and sane. He would advise against marriage in cases with fully organized delusions or hallucinations, those with periodical recurrences, paretics, tabetics, drunkards and sexual perverts. Marriage should never be recommended as a means of cure or the relief of hysterical, neurasthenic or hypochondriacal cases.

This paper opened a general discussion, an extensive report of which follows.

W. C. SANDY (Kings Park, N. Y.).

Brain

(Vol. 35, Part III, 1913)

1. On a Pedigree Showing Both Insanity and Complicated Eye Disease: Anticipation of the Mental Disease in Successive Generations. E. J. LIDBETTER and E. NETTLESHIP.
2. A Case of Progressive Lenticular Degeneration. JAMES E. SAWYER.
3. A Case of Periodic Paralysis. H. WILLOUGHBY GARDNER.

1. *Hereditary Combination of Mental and Eye Disease.*—This very completely charted pedigree showed a marked association between mental deficiency and ocular defects, the latter being partly developmental, partly morbid. The pathological changes are chiefly detachment of the retina, based upon disease of the choroid, but with iritis and secondary cataract in some cases. Both the mental and the ocular conditions are hereditary. Such an association had not been described before. Consideration of the details of the cases seems to make it probable that the ocular and mental defects are due to a common underlying cause, and do not stand to one another either as cause and effect or as accidental coincidences. Nor does it seem possible that the choroiditis and consequent retinal detachment can be attributed to the low or very moderate degrees of myopia found in certain of the patients, and that was also probably present in another, the myopia itself was more likely a manifestation of the same congenital imperfection of either the scleral or choroidal tissues that led to actual disease in the early life of some of the individuals. As the subject has not yet attracted much attention, the facts have been presented with a good deal of detail.

The ocular changes in the series are absolutely different from those known in cases of cerebral and spinal disease; neither optic neuritis, optic nerve atrophy, alterations of the pupillary reflexes, nor ocular palsies having been observed. With the doubtful exception of one man, who was thought to be suffering from general paresis, syphilis, whether acquired or congenital, does not seem to have been a factor in causing either the mental or the ocular degeneracies. Tubercle is known as the cause of death in two only of the affected stock, and tuberculous joint disease as having occurred in another. Alcoholic intemperance was sufficiently marked in some half dozen to be noted in the records of the institutions of which, at one time or another, they were inmates and this number, too, is, of course, the minimum. No consanguineous marriages are known. Of the individuals whose age at, or cause of death has not been ascertained, and who are not known to have had any defined mental or bodily disease, a large proportion of the adults of both sexes were recipients of Poor Law relief of one sort or another for various periods. It cannot be doubted that the great majority of these persons, omitting cases of accidental sickness and of disablement from old age, became paupers because they were not well enough endowed mentally, physically, or in both respects, to compete successfully in life.

The subject of anticipation in insanity has recently been dealt with fully and in detail by Mott, and study of his work confirms belief in the importance of this character, and the urgent need for the collection of data bearing on its occurrence in other diseases upon a larger scale, and with greater accuracy, than has been attempted hitherto. Some such facts and opinions have been recorded in reference to glaucoma (Lawford), senile and presenile cataract and diabetes (Nettleship), three diseases which appear to have no points in common. Some other maladies probably also show the same phenomenon. A few new cases of anticipation in diabetes are given in the present paper.

The authors conclude:

1. The pedigree which forms the basis of their paper shows an association between mental deficiency and ocular defects, partly developmental and partly morbid.

2. Amongst the members of the family charted, who are not known to

have had any defined mental or bodily disease, a large proportion have been recipients of Poor Law relief, showing that they were not well enough endowed mentally and physically to compete successfully in life.

3. The mental deficiency in this family tends to appear at an earlier age in each succeeding generation (anticipation), but anticipation cannot be proved for the ocular defects.

4. Anticipation may be well illustrated by cases of diabetes, of which some fresh instances are given in part II.

2. *Wilson's Disease*.—This is a detailed study of a patient with this new syndrome described in *Brain*, March 12, 1912, by Wilson. (See full abstract of Wilson's paper, *JOURNAL NERVOUS AND MENTAL DISEASE*, 1913, p. 540, August No.) The present case differs in the following way:

1. Age of onset. The age of this patient at the commencement of the symptoms is certainly later than most of the recorded cases. In many the symptoms began in childhood.

2. Duration of the illness. The disease has now been manifest for seventeen years, whereas in all the others there was a fatal termination within seven years. In one case the duration was only four months. There is no reason to suppose but that this patient may live many years longer.

3. Tremors. The tremors are always present, but vary in intensity from day to day, whereas in the recorded cases when they had developed they never seemed to diminish.

4. Rigidity. The muscular rigidity does not appear to have been less on one day than another in any of the recorded cases. In this patient the rigidity never disappears, but it varies in intensity from day to day, and also while under examination the rigidity changes distinctly in different parts of the body. A limb which is at one time extremely rigid may at another become comparatively flaccid.

5. There are no true contractures in this case, and these were such a marked symptom in all the other cases when the disease had been present even for a short time.

6. Dysphagia. There is dysphagia in this patient, only a difficulty in mastication.

7. Emaciation and weakness. There is no emaciation nor weakness. The patient is not fat, but he is strong.

Dr. Wilson examined the patient, and reported as follows: "The clinical picture presented by this patient offers the very closest analogies to that which I have seen and described in four cases of progressive lenticular degeneration. The combination of tremors, rigidity, and true hypertonicity, dysarthria, contracture-attitudes, the absence of any sign of pyramidal involvement, and the state of the reflexes, establish the case as essentially one of extra-pyramidal motor disease, and there can be, in my opinion, little doubt that from the pathological point of view the lesions are situated in, or at least involve, the corpus striatum and subthalamic region on both sides.

"Nevertheless, in certain particulars which seem to me to be important, the case differs from those already described.

"(1) The age of the patient and the known duration of the disease are not such as have hitherto been observed. Of course, where only a comparatively few cases in all have been recorded, one must be prepared for a variation such as this patient presents; nevertheless, the duration of the disease is much longer, no less than some ten years or more, than in any previously recorded instance.

"(2) Notwithstanding the great duration, there are as yet no signs either of emaciation or of contracture. When it is remembered that these have been prominent, and sometimes even early symptoms in every one of the known cases, I cannot but think that their absence constitutes an important distinction.

"(3) The actual form of involuntary movement presents certain peculiarities. The tremor is far from constant, although when it occurs it is typical in character. In the four cases described in my paper, the tremor was not only constant, but increased in severity with the progress of the disease. In Dr. Sawyer's patient there is occasionally a spasmodic movement of the lower facial musculature that resembles the 'mobile spasm' of Gowers, and may well be described as athetoid. There is also, on occasion, a more or less similar movement of the hands, which may be more fully characterized as athetoid than tremulous.

"In one or perhaps two of the recorded cases, it is true, a not dissimilar movement was observed; these were, however, notably acute cases, and in all the chronic cases that have been recorded, and that I have personally seen, the involuntary movement was one of never-ceasing tremor.

"(4) Occasionally the hypertonicity of the patient's musculature relaxes, when the limbs become flaccid, and even hypotonic. This was the case when I had the opportunity of seeing Dr. Sawyer's patient, in his hands and fingers; and one was surprised to find that the fingers could be notably hyperextended by passive movement where a moment before they were rigid and in a contracture attitude of flexion. Again, this cannot be regarded as an essential point of difference from a diagnostic standpoint, but I have not seen such changes in my own cases.

"(5) The dysarthria of Dr. Sawyer's patient is a long drawn-out, almost staccato utterance, which is not identical with that which I have seen myself.

"In mentioning these points, the desire has been not to magnify any possible differences, but to demonstrate in what way the patient presents features that have not hitherto been noted as occurring; and there does not appear perhaps to be any inherent reason why such symptoms should not also be regarded as belonging to the syndrome. I attach importance, however, to my first two points, and, in view of the apparently inevitable way in which the malady has steadily progressed in all the recorded instances of progressive lenticular degeneration, as well as in all the cases personally observed by myself, I venture to take leave to question whether in Dr. Sawyer's case we are dealing with identically the same disease, *i. e.*, a hepatitis with subsequent cirrhosis and a concomitant progressive degeneration of the lenticular nucleus."

3. *Periodic Paralysis*.—In this brief and imperfectly studied case the writer came to the conclusion that the attacks of periodic paralysis were due to auto-intoxication, the presence of the toxins being due to some congenital defect in metabolism. The reasons which led him to believe this may be briefly enumerated.

(1) The many points of resemblance to other conditions which are undoubtedly due to auto-intoxication.

(2) The sudden onset and the rapid recovery.

(3) The invariable occurrence of the phenomena after sleep, when waste and toxic products may be assumed to accumulate, just at the time that intestinal digestion is taking place.

(4) The fact that the condition might occasionally be walked off.

(5) The symmetrical distribution of the paralysis.

(6) The occurrence of headache, drowsiness, thirst, anorexia, aching of the limbs and sweating during the attacks. These toxic symptoms closely resemble those which obtain in other transitory toxemias.

(7) The fact that previous attacks of headache, in all probability toxemia, had been replaced by the attacks of paralysis.

(8) The high specific gravity of the urine passed during the attacks, and the presence in it of small quantities of indican.

(9) The presence of high pulse-tension with accentuated aortic second sound and slow pulse in the initial stages, and the cardiac dilatation and vascular dilatation which so rapidly followed.

JELLIFFE.

Deutsche Zeitschrift für Nervenheilkunde

(49. Band. 4-8. Heft.)

1. The Question of Dysbasia Angiosclerotica ("Intermittent Lameness").
FAVRE.
2. The Condition of the Cerebrospinal Fluid in Isolated Pupillary Disturbance. ASSMANN.
3. A Clinical Study of Post-Hemiplegic Phenomena. REZNICKE.
4. Brain Tumor with Hallucinations of Sight: Necropsy. JOSEFSON.
5. A Case of Tumor Formation in the Brain and in the Soft Membranes of the Whole Central Nervous System. LAHMEYER.
6. The Present-Day Standpoint of the Lues-Paralysis Question. NONNE.
7. The Occurrence of Lymphocytosis in the Blood-Picture, Particularly in the Functional Neuroses, and Its Diagnostic and Clinical Value.
SAUER.

1. *Dysbasia Angiosclerotica*.—In the course of three years this author examined 800 cases of arteriosclerosis and only 8 were found to have intermittent lameness; these are reported. The condition of "angiospastische Dysbasia" of Oppenheim was not observed.

As nearly as could be determined the etiological factors in these cases were: Tobacco + syphilis + flat-foot (1), tobacco + alcohol (4), tobacco + flat-foot (1), severe exposure to cold + flat-foot (1), and alcohol alone (1).

The abuse of tobacco being the most common factor, some special consideration is given it. In Russia a great many cigarettes are smoked, the tobacco is strong and the pernicious habit of inhaling the smoke into the lungs is indulged in.

2. *Cerebrospinal Fluid in Pupillary Disturbance*.—The author has studied two groups of cases: (1) Cases with changes in the cerebrospinal fluid with positive lues; (2) cases with normal condition of the cerebrospinal fluid.

In a review of the cases observed the author states that the investigation of the cerebrospinal fluid is most important, since it gives information as to whether or not there is an active disease of the meninges. Negative findings in the fluid is not proof positive that the pupillary signs are not due to syphilis, as they may have resulted from a worn out luetic process of the central nervous system. Difficulties arise when the patient is an alcoholic. There may be no outward signs of lues and the cerebro-

spinal fluid may show no changes. If a severe alcoholic polyneuritis is present, alcoholism must be considered as playing a part.

3. *Post-Hemiplegic Phenomena*.—This paper deals chiefly with the spastic and contracture phenomena of hemiplegia. There are four illustrations from a case of right hemiplegia which show the position assumed by the hands and fingers in attempts at use.

4. *Brain Tumor*.—Josefson's case showed occipital headache, rigidity of the neck, vomiting, diminution of vision, hallucinations of vision in the form of stars, brown spots and rings on the right side. No form of motor or sensory aphasia. No cranial nerve paralysis except that shown by a right abducens paresis. No pupillary disturbance. Necropsy showed a large tumor in the left occipital lobe.

5. *Tumor Formation in Brain and Membranes*.—Lahmeyer has made a very careful study of a case and gives a classification of tumors of the membranes, together with an exhaustive reference to the literature.

6. *The Lues-Paralysis Question*.—A timely paper prepared with the characteristic thoroughness of this distinguished authority. A feature here is an elaborate table compiled from the author's study of 82 families where syphilis was present in the husband or wife or both. Eight of these families were childless. In the remaining 74 there were 319 pregnancies, and from these there were 85 abortions and 71 still-born children. Of the remaining 163 children, 51 could not be investigated. Of the 112 studied, 47 were absolutely healthy and 65 showed signs of degeneration.

In cerebral syphilis the blood serum is positive to the Wassermann test in from 70 per cent. to 80 per cent. of the cases. The cerebrospinal fluid gives 20 per cent. positive to the original Wassermann but 100 per cent. positive with the intensive method of Hauptmann. Phase I was always present. Lymphocytosis usually present and frequently very marked.

In paresis or tabo-pearesis the blood serum was practically positive. The Wassermann test with a large quantity of fluid was present in 100 per cent. Phase I, in 95 per cent. to 100 per cent. Lymphocytosis in 90 per cent. to 95 per cent.

Tabes dorsalis gave a positive Wassermann in the blood serum in from 60 per cent. to 70 per cent. The Wassermann test with the fluid gave 20 per cent. positive with the original method and 100 per cent. with the intensive method. Phase I positive in 95 per cent. Lymphocytosis in 90 per cent. to 95 per cent.

There are fourteen accompanying illustrations which show well the microscopic appearance of cerebral syphilis in the human subject and also a number where syphilis has been experimentally induced in the rabbit.

7. *Lymphocytosis in the Blood-Picture*.—This hematological study contains many pages of tables and a report of eight cases. It is found that in all functional neuroses, particularly in hysteria and neurasthenia, there is with great regularity a lymphocytosis.

YAWGER (Philadelphia).

Book Reviews

ANATOMIA CLINICI DEI CENTRI NERVOSI, AD USO DEI MEDICI E DEGLI STUDENTI. Dott. G. Mingazzini. Prof. nella Regia Università di Roma. Seconda Edizione. Unione Tipografico-Editrice Torinese. Torino. \$6.00.

This is a monumental work of nearly a thousand pages containing a full description of our present day knowledge of the clinical anatomy of the nervous system. A second edition was called for five years after the issue of the first.

The opening chapters are devoted to the histology of the nervous tissues. Here a complete and up-to-date presentation is to be found, rich in illustrations. The general outlines of the embryological divisions of the nervous structures are then sketched and followed by chapters on the macro-microscopical structure of the spinal cord. The sensory and motor pathways of the cord are then taken up with a chapter following on acute lesions of the gray substance of the spinal cord with full clinical and pathological details. Systemic and asystemic degenerations of the cord then follow. The cerebellum is then described from all points of view. Nine chapters of the thirty-nine are thus occupied. The remaining chapters contain a mine of information, systematically arranged, well illustrated and altogether of a high order of presentation. We cannot enter into the complete detailed discussion of the volume, but it is one of high merit from all points of view.

JELLIFFE.

LEHRBUCH DER NERVENKRANKHEITEN FÜR AERZTE UND STUDIERENDE. Von Prof. Dr. H. Oppenheim in Berlin. Sechste, wesentlich vermehrte und verbesserte Auflage. S. Karger. Berlin.

The sixth edition of Oppenheim's justly celebrated text-book appears in two volumes of nearly 1,000 pages each. It is five years since the appearance of the previous edition, certainly an indication that the work had found great favor.

The chief new materials found in this edition deal with our increased knowledge of poliomyelitis, the advances consequent upon the finding of the characteristic serum reactions in syphilis, the discovery of salvarsan, the wide pathways that open up with a firmer grasp of the functions of the internal secretions and their glands, the hypophysis, thyroid and other blood glands, the new researches on the sympathetic nervous system and the marvellous impetus given to the study of the vestibular neurocerebellum.

This material has been faithfully worked into the new book which is, as it always has been, a marvel of completeness and a standard of neurological erudition.

JELLIFFE.

THE BOOK OF THE DEAD: THE PAPYRUS OF ANI, SCRIBE AND TREASURER OF THE TEMPLES OF EGYPT, ABOUT B. C. 1450. By E. A. Wallis Budge, M.A., Litt.D., Keeper of the Egyptian and Assyrian Antiquities in the British Museum. G. P. Putnam's Sons. New York.

A new work from an author who has at his command such a knowledge of ancient Egyptian literature and such ready access to the original materials as has Mr. Budge must be heartily welcomed. The fact that he adds to this equipment a discerning insight into the beliefs and rituals of this ancient people as expressions of natural development and growth gives his books a special interest and value for psychoanalysis. His material in these volumes is drawn directly from the Book of the Dead as inscribed in earlier Pyramid and Coffin Texts and in later papyri.

He first gives a brief history of the Book of the Dead proving its great antiquity, its beginnings reaching back further than the earliest copies yet discovered. It is the later form in use in the eighteenth to the twenty-first dynasties to which the Papyrus of Ani belongs, the Theban Recension, an outline and description of which is given. Then after a discussion of the important beliefs revealed in general in the Book of the Dead, with descriptive lists of the gods and places mentioned in it and an extract from an early "Liturgy of Funerary Offerings" the Papyrus of Ani is given in full. Mr. Budge has indeed spared no pains in making this available in most attractive and instructive form. A supplementary volume contains a facsimile of this papyrus in thirty-seven plates consisting of the text, the accompanying vignettes and the rubrics where they are found. A detailed explanation contained in the first volume renders these plates fully intelligible to the reader and adds to the interest with which he follows the translation of the text, which following along with the hieroglyphic rendering, forms the third volume.

Whether in the author's exposition of their beliefs as he has discovered them for us or whether in the very texts and vignettes themselves, to which he has given us the key, there is abundant material here for that comparative study of the beliefs and fancies of this ancient people in connection with the phantasies still found in those who because of neurotic conditions have retained their infantile ideas, which have strong compulsive power toward similar beliefs and ceremonials.

Such creation and birth phantasies, for example, abound in the Book of the Dead. The mouth and the eye, preëminently the indispensable Eye of Horus, are the sources of creative life as well as of the continuance of life to the dead. As in infantile sexuality the Egyptian ideas of life-giving and procreative sources are widely diffused. The celestial waters and those of the Nile, the spoken word, tears, emissions from the divine bodies all represent these sources and from these is obtained everlasting life for the dead by the faithful use of the magic Book of the Dead. The many gods, even the greatest, according to varying legends came into existence by these methods of creation and men, too, came into being in such ways.

There is but a thin veil of symbolism over the formation of the hieroglyphic for rain, which represents a falling sky with four pillars projecting through it, a symbolism more complete, however, in later times, when the pillars come to represent the four cardinal points guarded by the four sons of Horus, the son of Osiris, the god of death and resurrected life.

The birth and the constant re-birth of the sun were connected with the mouth, the eye or the celestial waters; or the sun as the course of life was

identified with the ball of excrement which the beetle rolls along as food for the young, the ancient sun-god himself being identified with the beetle. The darkness of night, when the life-saving sun-god had disappeared, was filled with wild fancies revealing the libidinous strivings crudely sublimated in their concrete beliefs concerning the god's nightly journey through the kingdom of darkness, the terrors of which the deceased, too, must meet in his journey to Osiris. It was the vital character of these beliefs, the fact that they were an expression of the compelling, instinctive power within that drove them to such elaborate and time consuming rites and ceremonials for the dead, and made the Book of the Dead one great amulet or series of amulets to deliver them from these vaguely threatening forces and preserve them for the pleasures of the life in the other world.

The Book of the Dead explained to us as it is here and given to us at first hand in so large a portion of it, forms a valuable source of comparative study for the further understanding and mastery of these phantasy forms in the mental conflict of the neuroses.

JELLIFFEE.

LA CONSCIENCE MORBIDE. Essai de Psychopathologie Générale. Par le Dr. Charles Blondel. Docteur ès lettres, Agrégé de philosophie. Felix Alcan. Paris.

This volume well illustrates how futile it often may be for a non-trained worker in medicine to center into a foreign field with the hope of giving something of value. Out of seven case histories, given from their purely superficial and anecdotal formulations, the author has attempted to erect a nosological entity which he calls morbid consciousness.

He juggles with a group of words, verbal imitations of things, and never penetrates beyond the analysis of their acquired meaning. The real patients, their behavior, the motives actuating their conduct, these are only seen in the light of a library desk hypothesis.

T. G. SELLEW

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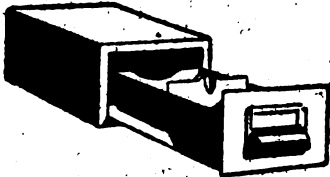
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The Journal OF Nervous and Mental Disease

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Original Articles

PARALYSIS AGITANS SYNDROME WITH SYPHILIS OF THE NERVOUS SYSTEM¹

BY CARL D. CAMP, M.D.

ANN ARBOR, MICH.

The chief points to which I would call the attention of the society are: First, a review of the cases reported as combinations of Parkinson's disease and tabes dorsalis with a more rational explanation of their occurrence than as merely a coincidence. Second, a report of a case in which the typical symptoms of Parkinson's disease were present but which clinical examination, as well as study of the blood and spinal fluid, showed to be a case of tabes. The rapid relief of the pseudo-Parkinson syndrome following the use of salvarsan shows that these symptoms were probably due to the syphilitic process. Subsequent study of the cerebrospinal fluid in ten cases of Parkinson's disease showed no changes similar to those found in the above case and the intravenous injections of salvarsan in six of these cases caused very slight improvement, if any.

Heinmann (according to Placzek) was the first to report, in 1888, a case of tabes dorsalis and paralysis agitans in the same patient. Placzek reported the second case, in 1892, in a male, age 52 years, who first complained of lancinating pains and three years later developed a typical paralysis agitans tremor. The

¹ Read at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914.

examination of the patient showed Argyll-Robertson pupils, impotence, positive Romberg sign and lost knee jerks. In 1898, Weil reported a case of paralysis agitans in which there was absent pupillary and patellar reflexes but no luetic history and no bladder symptoms or pains. He regarded the case as most probably one of a combination of the two diseases. In 1900, Hess and also Wertheim-Salomonsen reported similar cases although the latter objected to calling it a coincidence of the two conditions and preferred to describe it as a new clinical entity, "Tromoparalysis tabioformis (cum dementia)." His case differed from the others recorded in the fact that there was a history of apoplectiform attacks and a marked dementia. In the same year Seiffer again reported the cases previously reported by Placzek and by Weil. In 1902, J. H. W. Rhein reported a case of tabes dorsalis in which there was a tremor resembling that of paralysis agitans. The other symptoms of paralysis agitans were not noted. Additional cases have been reported by Koddermann, Penzoldt and Stintzing, Bychowski, L. Bruns, Eichorst, Eshner, and Kurt Mendel (four cases). In the last two reported by Mendel the Wassermann reaction was positive.

It seems likely that some of these cases have been cases of tabes dorsalis or cerebrospinal syphilis in which there occurred, as a symptom, a tremor like that of paralysis agitans; the cases reported by Eichorst, Rhein, and Wertheim-Salomonsen may have been of that kind; excluding such cases, there still remain a number in which there is apparently a complete clinical picture of that disease. They are usually explained as due to a simple coincidence though such an explanation is not entirely satisfactory. It seems certain that there is nothing in common in the etiology of paralysis agitans and tabes for it is very unusual to obtain a history of lues in cases of paralysis agitans. The suggestion of Dupre (quoted by Mendel) that the tabes like symptoms in some cases of paralysis agitans may be due to sclerosis of the posterior spinal artery causing changes in the posterior columns does not fit the facts for, while it might explain the ataxia and loss of reflexes, it would not explain the lightning pains or the spinal fluid findings. Furthermore, such an explanation would not be possible where it was demonstrated by examination of the blood and spinal fluid that syphilitic disease was present. Cases of

general paralysis in which there has been observed a tremor similar to that of paralysis agitans have been reported by Reuter, Maillard and by Krabbe, but in none of these cases were other symptoms of paralysis agitans present. Maillard attributes the tremor in the case reported by him to a localized lesion in the cerebral peduncle though he had no autopsy findings. Krabbe's case with necropsy and histological examination of the central nervous system, showed only the lesions ordinarily found in general paralysis and no localized lesion in the mid-brain (serial sections of the region of the red nucleus).

The case observed by me was as follows:

The patient was 53 years old when she was admitted to the hospital, complaining chiefly of difficulty in walking and in the use of her right hand, in which there was a constant rhythmic tremor. There was nothing especially noteworthy in the family history except that she came of a very long lived family. She had had no serious illness except that at the age of 50 years she had had her uterus and ovaries removed on account of fibroid tumor. Her first husband had been killed in an accident. Her second husband was living and well. She had no children. About two years before her admission to the hospital she had an attack which she described as a burning, distressed feeling in the stomach which lasted several days, and while in bed with this trouble the right arm began shaking. This tremor gradually became more severe and also involved, slightly, the left hand. About six months after the onset of the tremor she began having pains in the legs which she said felt as if a knife were occasionally "jabbed" into it and at about the same time she noticed that her legs were numb and weak. These pains gradually extended to other parts of the lower extremities and she said that during the pains this flesh was very tender but as soon as the pain stopped the soreness disappeared. She had had several attacks of epigastric pain. She had noticed a paresthesia as if a fly were walking on her head and had frequently had a feeling of intense heat with an outburst of perspiration. She also described a feeling in the face as if the part had been washed in soapy water and it had been left to dry on the skin, and as if cloths wrung out of hot water were wrapped about her arms. She also said that she choked very easily but never had any regurgitation of fluids through the nose on attempting to swallow them. An examination made on admission to the hospital showed that the patient was decidedly over stout. Her face was expressionless and smoothed out. The eyeballs were prominent and there was rare winking. There was a decided hypertrichosis on the upper lip and chin and wide cheek bones

but no signs of acromegaly. There was no enlargement of the thyroid gland. The right arm and hand were held flexed and showed a rhythmical tremor of the pill-rolling type, typical of paralysis agitans. It was made worse by excitement and was absent when she was asleep. It stopped momentarily when she made a voluntary movement of the hand. The head showed a lateral oscillatory tremor at least in part transmitted from the arm. It was made worse by holding the arms. Occasionally there was a tremor in the left arm and in the right leg. Speech was somewhat monotonous but was otherwise normal and deglutition was not interfered with. The right pupil was larger than the left, neither reacted to direct or consensual light stimulation but both reacted promptly in accommodation. The extraocular movements were normal and there was no nystagmus, but at times in following the finger the eye would give several irregular movements. She said that for a moment the finger would go out of sight and that then she would see it again. The visual form and color fields were normal except for some interlacing of the red and blue. The ophthalmological report (Dr. Walter Parker) was that both eyes showed changes similar to those in retinitis circinata. There was no paralysis of the face, tongue or soft palate. There was no paralysis and no atrophy or deformity of the upper extremities. The grip was equal in the two hands. There was no ulnar deviation of the fingers. The right arm was more rigid to passive motion than the left but the biceps and triceps reflexes were prompt and equal on the two sides. Her station with the eyes open was good although she stood with her body bent slightly forward; when she closed her eyes she swayed markedly and would fall if not supported. In walking the right leg was held rather more stiffly than the left. The toes scraped the floor in the arc of a circle, her steps were short and there was some tendency to propulsion. If her eyes were closed, she staggered and could not walk at all. There was no weakness in the movements of the lower extremities. Both legs were somewhat rigid on passive motion, the right slightly more so. The legs were very stout and the flesh tender on pressure. The knee jerks were prompt and equal on the two sides; the Achilles jerks were not obtained. Plantar irritation caused flexion of the toes on both sides. The chest and abdomen were excessively stout but the umbilicus reflex was prompt on both sides.

Sensation to touch and pinpoint was normal in the face and upper extremities and localizing sense and the sense of motion and position were normal in the fingers. Sensation to pinpoint was delayed over the outer portions of both thighs and in the right leg below the knee. Light touch was not felt in the right leg below the knee except in the sole of the foot. The sense of motion and position of the toes was lost on both sides.

An examination of the urine was negative; the specific gravity, 1.025.

The examination of the blood showed: hemoglobin, 55 per cent.; red blood corpuscles, 3,600,000; white blood corpuscles, 9,950. A differential count of five hundred white blood cells showed: polynuclears, 56.6 per cent.; small lymphocytes, 18.2 per cent.; large lymphocytes, 14.2 per cent.; eosinophiles, 4.4 per cent.; and transitionals, 6.6 per cent. The Wassermann reaction was positive (XX). Blood pressure, 95 mm. Hg.

Aside from the marked adiposity, a general physical examination was negative. The heart and lungs were normal.

A lumbar puncture was done May 1, 1913. The cerebrospinal fluid was under increased pressure and 25 c.c. were removed. It was clear and colorless. There were 130 cells per c.mm. which stained slides show to be all lymphocytes. The Nonne-Apelt reaction, phase I, was positive though not marked; phase II was also not marked. The Noguchi butyric acid reaction and the carbolic acid reaction of Pandy were present. The Wassermann reaction on the spinal fluid was positive (XXXX). Reducing substance was present in the spinal fluid in about the normal amount.

A pelvic examination showed only the cervix remaining, but no demonstrable pathology.

She was then given three intravenous injections of neosalvarsan. She said that she noticed a lessening of the tremor after the second injection and after the third it was much better. An examination showed practically no tremor, considerably less rigidity, and an improvement in sensation in the feet. She could walk much better.

She returned to the hospital three months later, at my request, for a reëxamination. She said that she felt practically well and her weight was 200 pounds. Her facial expression was masklike and there was rare winking. There was slight rigidity in the right arm on passive movements but there was no tremor and it hung by her side. The Argyll-Robertson pupil and other signs of tabes were about as before. The urine was negative. The Wassermann reaction on the blood and also on the spinal fluid was strongly positive. The pressure of the spinal fluid was increased and it contained 110 lymphocytes per c.mm. Nonne-Apelt reaction, phase I, was positive; phase II, positive; and Pandy's carbolic reaction was positive. Three months later she was again examined with practically the same findings.

So far as I am aware, a study of the spinal fluid has not been made in any considerable number of cases of paralysis agitans. In ten cases, typical in all respects, I found that it was normal.

The cell count in all cases averaged under four, the globulin and albumin were not increased and reducing substance was present. Six of these patients received intravenous injections of neosalvarsan. One patient, age 45, having the disease about two years, claimed that the tremor was lessened, that his appetite was better and he had less stiffness; objectively, there was a slight lessening of the rigidity but the characteristic tremor persisted. In two other cases there was an improvement subjectively but no objective change. One patient developed severe nausea and vomiting after the second injection and refused further treatment. In two, the treatment had no effect whatever.

In view of all the facts presented, I would conclude that a typical Parkinson syndrome may coexist with and be caused by a syphilitic lesion in the central nervous system but that this is not the etiology of the disease paralysis agitans and, furthermore, that any lesion in the central nervous system causing a Parkinson syndrome is likely an irritative rather than a destructive one.

OBSERVATIONS ON EPILEPSY CHIEFLY FROM AN X-RAY STANDPOINT¹

BY T. M. T. McKENNAN, M.D., GEORGE C. JOHNSTON, M.D.
AND C. H. HENNINGER, M.D.

These observations have extended over a period of two years. Two years ago one of us (George C. Johnston) noticed an abnormal appearance in the base of the skull of epileptics shown on the X-ray negatives of these cases. He called the attention of the two other writers of this paper to the matter. Since that time we have studied the cases together.

In September, 1913, Dr. Johnston read a paper before the American Roentgen Society entitled "Radiography of the Pituitary in Its Relation to Epilepsy." Bone changes in the base of the skull, more especially in the region of the sella turcica were noted.

"These changes consisted for the most part in an overgrowth of the anterior and especially of the posterior clinoid processes which in addition to the increase in area and length, are folded over and down upon the pituitary gland, frequently enclosing it within a bony basket. The fossa is largely or completely roofed over in some cases in addition to this overgrowth of the clinoidal processes. A large proportion of the cases show a distinctive increased density in the bony tissues forming the roof of the orbits, the sphenoidal sinus and the sphenoidal cells. In quite a number of cases the sphenoidal cells are decidedly blocked with newly formed bony tissues."

Dr. Johnston regarded the above named paper as a preliminary report on this subject.

Our observations to the present time comprise ninety-five cases, and a study of these cases develops the fact that they can be divided into different classes.

Seven of these cases were found to be pituitary tumors, and in only one of these was there any other evidence of involvement of the pituitary gland aside from the epileptic attacks.

¹ Read at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914.

In these tumor cases there was no local bony thickening at the base of the skull, in fact local thinning of the body of the sphenoid or the clinoid processes from pressure was found almost constantly.

In sixteen cases there was local thickening of bony tissue that was confined to enlargement alone of the clinoid processes, or to thickening in the anterior fossa of the base of the skull.

In twenty-two cases the local bony change was found in two situations, namely, the clinoid processes and the base of the anterior fossa.

In thirty-five cases there were bony changes in three situations, namely, the clinoid processes, the anterior fossa and the body of the sphenoid bone.

In these cases there is an appearance of thickening along the entire base of the skull.

In fifteen cases no bony alterations were found.

An analysis of these latter cases shows that six of them gave clinical evidence of being cerebropathies; two of them gave clinical evidence of being paresis. One case showed a calcareous degeneration in the center of the pituitary region. One case showed on the X-ray plate that it was a case of internal hydrocephalus. In one case the picture was taken one week after the first attack. In another case, six months after the first attack. The three remaining cases had been epileptic from three to five years with infrequent attacks.

TOTAL NUMBER OF CASES		TABLE OF PERCENTAGE	
			Per Cent.
Tumors	7	Tumor cases	7.36
No features	15	No features	15.26
One feature	16	One feature	16.83
Two features	22	Two features	23.16
Three features	35	Three features	36.83
Total number	95		

In all cases the average age was twenty-three years.

In the first class of cases, namely where the clinoids alone were involved, or the base of the anterior fossa alone was involved, the average length of time of the existence of the epilepsy was five and a half years. In these cases, fourteen per cent. showed frequent attacks. (If attacks occurred as often as once in two weeks we called them frequent; if attacks averaged only one per month we called them infrequent.)

In the second class of cases, namely, with changes in the clinoid processes *and* the base of the anterior fossa, the average length of time of existence of the epilepsy was seven and a third years. Twenty-five per cent. of these cases had frequent attacks.

In the third class, namely, with changes in three places, the average length of time of existence of the epilepsy was four and two thirds years. Sixty-six and two thirds per cent. of these cases had frequent attacks.

It would seem evident, therefore, that frequency of attacks has more to do with producing local bony changes than the length of time of existence of the epilepsy. Age does not appear to signify as far as bony changes are concerned. For instance, one case, five years of age, exhibited all the features, whereas one case, fifty-six years of age, showed only one feature.

Comparing the X-ray plates of cases where there is no history of epilepsy with the plates of epileptics, shows a marked difference. In the examination of an equal number of plates where there was no history of epilepsy, we found four with marked clinoids, two with a thick anterior fossa, two with two features and one with three features, about ten per cent. of alteration, whereas leaving out the cases of tumor we found the percentage of bony changes in the epileptics is eighty.

Going over all the plates of lateral views of the skull that we could find in Dr. Johnston's large collection, we found only two plates that showed the three features markedly in cases where there was no history of epilepsy.

One of these was a case of bitemporal hemianopsia, with a positive Wassermann in which symptoms disappeared under treatment.

Examination of the plates of general acromegalics reveals the fact that there is no local change of any degree in the situations that we find involved in the epileptic.

It would seem probable, from our observations, that the bony changes in epileptics are found only in the so-called essential or idiopathic epilepsy. In none of the symptomatic cases of epilepsy were there any bony changes found. Symptomatic cases examined by us were cases of paresis, primary and secondary cerebropathies and internal hydrocephalus.

The interpretation of the changes found at the base of the skull in the essential epilepsies at first seemed to us to be very difficult. Our first idea was that it had an inflammatory origin.

This we were forced to abandon for the reason that we could find no cause of an infective character that would produce inflammation, for the relative regularity of the changes in certain situations in the cases examined. The viewpoint that the bony overgrowth is a local acromegaly and that the bony deposit is brought about through venous congestion at the base of the skull, seems to us to be the only logical explanation.

To comprehend this a knowledge of the venous circulation at the base of the skull is essential. The veins from the anterior lobe of the pituitary gland empty into the intercavernous sinuses and the secretion from the anterior lobe of the pituitary is poured into these sinuses. The intercavernous sinuses vary in number from one to three; there is probably an average of two. Knott found a single intercavernous sinus in twelve out of forty-four examined. In fifteen out of forty-four he found two. Most text-books of anatomy give these two intercavernous sinuses the name of the circular sinus. It should, however, be noted that the intercavernous sinuses are really veins and not sinuses. Hence they are collapsible.

These intercavernous veins serve to join the two cavernous sinuses and they receive also a number of small veins from the adjacent parietal dura mater. This dura, as we know, is the internal periostium. These dural veins drain an area of the base of the skull comprising the clinoid processes and the dorsum sella, the anterior fossa and the body of the sphenoid. The anastomosis of these veins with other veins probably varies considerably. The bony deposit in epileptics corresponds to the areas drained by these dural veins of the base and leads directly to the conviction that the process of bony change can only be brought about by some pressure within the small confined boxlike space that contains the pituitary gland as well as the intercavernous veins.

Pressure within this boxlike space that would prevent the intercavernous veins from discharging their contents into the cavernous sinuses, would cause the blood in this boxlike structure to be backed into the dural veins. The circulation at this point would be reversed and the blood loaded with secretion from the anterior lobe of the pituitary gland would bathe the bony structure of the base of the skull in the region of the clinoid processes, dorsum sella, the anterior fossa and the body of the sphenoid

bone. Increased bony deposit would consequently be the result. This deposit, however, would vary in amount depending upon two factors; first, the duration of pressure that causes the reversal of circulation; and second, upon the freedom of anastomosis of the dural veins.

The next question that logically arises is: What can cause the pressure within this boxlike structure? Hypertrophy of the pituitary gland is improbable for this condition has not been found in postmortem examinations of epileptics. It seems more probable to us that it is intermittent hyperemia and this viewpoint is somewhat confirmed by the fact that postmortem examinations of epileptics reveal abnormally large veins within the pituitary gland.

The question then naturally arises: What is the cause, or what can be the cause of intermittent hyperemia in this situation? Does it occur from the attack of epilepsy with the attendant general venous congestion? We think this extremely improbable, for our cases of symptomatic epilepsy showed no bony deposit. Again, hyperemia, the result of an attack of epilepsy, would naturally last for a few minutes only and the blood stream would soon return to its normal course. Hyperemia would have to exist for hours or days to permit of any bony deposit.

It seems more probable that the venous hyperemia would be due to some vasomotor disturbance of the anterior lobe of the pituitary gland. This same venous hyperemia would doubtless tend to prevent a proper amount of secretion of the posterior lobe from gaining access to the third ventricle by way of the infundibulum and in all probability repeated hyperemias would cause a degree of crippling of the entire pituitary gland, the posterior lobe, as well as the anterior lobe.

If hypopituitarism of the posterior lobe is the important factor in carbohydrate tolerance, and if carbohydrate tolerance is increased in epilepsy, this fact would be evidence of crippling of the posterior lobe. In all the cases examined, fourteen in number, we found a high degree of carbohydrate tolerance.

Brain changes in epileptics, when found, are looked upon by pathologists as being largely of a secondary character. That the crippled posterior lobe may be a factor in these changes seems probable, if we accept the view expressed by Andriezen and others, that the secretion of the posterior lobe serves to neutralize

and render inert the noxious material produced by nerve cell action. In paresis, the cerebropathies, internal hydrocephalus and other states, such as arterio-sclerosis, the cortical irritability that may result in an epileptic attack, may be due to the impossibility of the secretion from the posterior lobe gaining an access to the cortex. The source of the secretion in these cases may not be in any way inefficient.

As to the effect of pituitary feeding in the cases of epilepsy, we are unwilling to state any positive convictions, too many factors entering into the question of results in the treatment of epilepsy to make positive the result of any one line of treatment in a relatively limited number of cases.

Thirty-five of our cases have taken pituitary extract for a period of time, varying from eighteen months down to two or three months. In some instances we noted a reduction in the number of attacks in individuals who had previously taken bromides without effect.

We are rather inclined to the viewpoint that in the essential epilepsies pituitary feeding will be found to have very little good effect. We think it more likely that pituitary feeding may have more effect in some of the symptomatic epilepsies than in the essential epilepsies. It is our opinion that while it is probable that a moderate degree of hypopituitarism exists in essential epileptics at all times, nevertheless that the epileptic attack in these cases is probably precipitated by sudden cessation of practically all secretion from the posterior lobe due to sudden pressure upon the posterior lobe from hyperemia of the anterior lobe. The variability in the course of essential epilepsy would seem to be dependent very largely upon that vasomotor factor in the production of hyperemia of the anterior lobe, and the cause of this vasomotor disturbance seems to us to be impossible to ascertain.

To sum up we find a condition of local acromegaly in essential epilepsy. This can only be due to venous stasis. This stasis can only come in one way, namely, from pressure within the boxlike structure that contains the pituitary gland. The evidence appears to be in favor of a crippling of this gland by pressure. Hypopituitarism would consequently be the result.

It is known that epilepsy accompanies this condition. Therefore, it would appear that so-called idiopathic or essential epilepsy is due to a mechanical injury of the pituitary gland.

SPASMODIC CLOSING OF CEREBRAL ARTERIES IN RELATION TO APOPLEXY¹

BY ALFRED GORDON

OF PHILADELPHIA

One of the fundamental principles in the physiology of the vasomotor apparatus is the existence of a central mechanism which lies in the medulla near the calamus scriptorius. Impulses that continuously flow from this area maintain the tonus of the bloodvessels.

Destruction of this bulbar center is followed by abolition of the vasomotor reflex and the bloodvessels remain dilated. Stimulation of the central ends of many nerves reacts reflexly on the blood pressure. Sollman and Pilcher² have shown that division of both vagi stimulates the vasoconstrictor center, that electrical stimulation of the afferent vagus causes vasoconstriction and that stimulation of the efferent vagus is followed by vasoconstriction referable to acute cerebral anemia.

For a long time there was a belief that cerebral bloodvessels have no independent innervation and that they followed passively variations in blood-pressure. Gradually this contention proved to be incorrect. It was observed that during inhalation of chloroform in spite of the fact that the blood pressure is low, the bloodvessels are found dilated. Evidently chloroform has no direct influence on vessel walls, but on the vasomotor center, which is an indirect proof of dependence of cerebral bloodvessels on this center. That the brain is capable to regulate its circulation by means of vasomotor influences is seen particularly from the researches of Müller and Siebeck.³ Their 25 experiments show that in a pronounced fall of blood pressure the cerebral bloodvessels dilate. Vasodilation may also be observed alongside of fall in blood pressure when remedies such as strychnia are given

¹ Read at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914.

² Amer. Jour. of Physiology, Vol. XXX, No. 3, 303, 1912.

³ Verhandlungen des Congresses der innere Medizin, 1906, Vol. 23, 351.

which act as constrictors on the center. On the other hand there are poisons that act directly on the walls of the bloodvessels, adrenalin for example. Biedel and Reiner produced contraction of the cerebral bloodvessels by injection of adrenalin into the carotid arteries. Finally an anatomical proof of the independent innervation of the cerebral vessels was supplied by Obersteiner who showed the existence of nerve elements in the walls of those vessels. Gulland showed the existence of nerves on the pial vessels.

The above-mentioned bulbar center is not the only one that has an influence on the vasomotor apparatus. Observations are on record which tend to prove that vasomotor disturbances may be also of cortical origin. Rossolimo reports a case of a cyst in one motor area with vasomotor disturbances in the contralateral hand. When the cyst was removed the hand became normal. Friedländer and Schlesinger observed a case in which vasomotor disturbances followed the removal of a portion of cortex. Mager⁴ reports two cases of brain tumor in the motor area with vasomotor disturbances. The cortex therefore contains a vasomotor center (presumably the motor area) from which probably run fibers to the center in the medulla oblongata. One may be reinforced or inhibited by the other. When we take into consideration the above facts concerning the vasomotor function in our study of cerebral manifestations dependable upon local disturbed circulation, we observe that the latter finds its logical explanation.

Temporary contractions of cerebral bloodvessels have been observed from suprarenal and pituitary glands. Cushing⁵ demonstrated blanching of the bloodvessels in the pia with adrenalin. Carl F. Wiggers has shown the same active vasomotor phenomena with drugs.⁶ Temporary contractions of retinal arteries have been observed in quinine poisoning. Spasmodic contractions of cerebral vessels as well as other vessels have been observed in Raynaud's disease. Williamson in his work on diabetes mellitus calls attention to cases of intermittent hemiplegia occurring in the course of diabetes without any visible lesions at autopsy.

There is a well-known group of cases which present such a characteristic clinical picture that the question of temporary clos-

⁴ Arbeiten aus dem Neurologischen Institute, Vol. 16, II, p. 340.

⁵ Amer. Jour. Med. Sciences, CXXLV, p. 375, 1902.

⁶ Amer. Jour. of Physiology, 1908, XXL, p. 454.

ing of cerebral arteries may be answered in the affirmative. William Russell aptly compares it to a condition which has its legitimate place in medicine and is known as "intermittent claudication." The latter is due to an obstruction in the arterial supply when the muscles of the limbs are put into action. The analogy is evident if we apply the conception of this phenomenon to what occurs in the brain when we observe intermittent, temporary or transient attacks of hemiplegia or monoplegia. These attacks of paralysis may or may not be accompanied by aphasia of equally transient character. Instead of complete motor hemiparalysis there may be only hemiparesis or a very slight weakness. Sometimes there may be repeated attacks of paresthesia on one side and each sensory attack usually leaves a slight feebleness on the same side.

For a period of eight years I have been able to observe and follow up fourteen cases of this character. Six of them are still living; eight died and I succeeded in obtaining permission for autopsies. Every one of the patients was seen by me in each attack.

FIRST GROUP OF EIGHT PATIENTS WHO DIED

The clinical histories are in their essentials identical. The main characteristic manifestation was a sudden onset of hemiparesis. The latter was never complete. Sometimes it was pronounced, sometimes moderate and at other times exceedingly slight. The degree of involvement of the limbs was in some attacks so imperceptible that with only a very careful test a slight difference could be detected in the power of the affected and unaffected extremities. The number of attacks varied from one individual to another. Two of the series had an attack about every three or four months. Others had them on rarer occasions, once or twice a year, one patient had but three or four during eight years. Finally three of them had very frequent attacks more of a sensory character than motor: Suddenly they would feel a tingling in one arm and leg, and sometimes only in the arm. This condition was always followed by a weakness on the same side.

All these attacks were transient. In the patients who had only three or four attacks the paralysis lasted longer than in those

with a larger number of seizures. However, their duration was never longer than a few days. The briefest time was a few minutes. In some cases an attack lasted several hours. Two patients of this series had at first very short attacks, but later the attacks became more prolonged. It is interesting to note that no matter how slight the apoplectic attack may have been, there would always remain a certain degree of a paralytic state ranging from a mere weakness to a perceptible paretic condition. Objectively in the very mild cases I would find a difference in the dynamometric measurements of both hands, a slightly increased patellar tendon reflex on the affected side. While Babinski's sign was invariably absent, nevertheless stroking of the sole would give no response of the toes, but on the normal side a similar stimulation would produce a distinct flexion of the toes. Oppenheim's reflex was always absent and the paradoxical reflex was present in six out of the eight cases. These pathological manifestations in the reflexes were present from the first attack even when the latter was of a sensory nature and persisted during the intervals between the individual attacks. It was also observed that very brief attacks occurred more frequently than attacks of longer duration. After a few slight recurrences the attacks became more prolonged. In all the eight cases the morbid motor phenomena became more pronounced when the attacks became more prolonged. Finally all the cases of the first series terminated with severe apoplectic insults, some with and others without aphasia. Henceforth the hemiplegic condition remained permanent. The subsequent histories of the patients present nothing that deserves special mention. They all came to autopsy and softening of various intensity and size was found. They all occupied the area of the internal capsule involving also portions of the basal ganglia.

The patients were all male individuals whose ages ranged from 55 to 70. Six of them presented distinct clinical evidences of arteriosclerotic changes, viz., hardened peripheral arteries, high blood pressure, accentuation of the 2d aortic sound. Two patients presented no hardening of the peripheral arteries, but their blood pressure ranged from 180 to 195. Four patients had a distinct syphilitic history, two had both syphilitic infection and chronic alcoholic intoxication. One patient showed symptoms of plumbism. One patient was a heavy smoker (from 10 to 15

strong cigars a day). The Wassermann reaction was positive in the first seven cases. The first five patients led a sedentary life and consumed large quantities of food. Iodides and mercurials were administered to all the eight patients. Only three of them consented to the use of salvarsan. It happened that these three patients had the very light attacks mentioned above. The effect of salvarsan was the prolongation of intervallary periods between the attacks. The same may be said with reference to mercury and iodids. Nitroglycerine administered early in the course of observation and kept up at various intervals, also the antisyphilitic remedies have to all appearances prolonged the lives of the eight patients.

SECOND GROUP OF SIX PATIENTS WHO ARE STILL LIVING

They all presented at various times intermittent attacks of apoplectic nature. Four of them had a great many attacks of sensory, viz., paresthetic nature: a sudden tingling in one arm or in arm and leg on the same side lasting but a few minutes and followed by a certain amount of weakness and numbness. Like in the first group this paretic condition persisted and in view of frequent repetitions of the attacks it remained permanent. After a long series of the brief sensory insults during a period of one to two years more serious and more prolonged attacks occurred. They consisted of both sensory and distinct motor manifestations simultaneously. Their number has been very limited, not more than three or four attacks occurred during the last two years. With each subsequent attack the paralytic condition was more and more pronounced. The last attack which occurred recently was a genuine apoplectic insult consisting of complete hemiplegia and aphasia. The latter was recovered only in two cases. The four patients are still living, but they are permanently affected and two of them are aphasic. Changes in reflexes have been observed in all four cases even at the first attack and an increased knee jerk appeared from the beginning and remained permanent. Babinski's sign was absent in the purely paresthetic cases, but it made its appearance when motor weakness became conspicuous. The paradoxical sign was not elicited at first but rapidly appeared even before the motor symptoms became pronounced. Ankle-clonus is evident now, but could not be brought out before the final complete hemiplegia developed.

The remaining two patients of this series present very interesting features. One of them is a physician nearly 75 years of age who had three attacks within four years. The first attack consisted of a temporary aphasia with a weakness in the right arm. The aphasia disappeared in 3 hours; the paresis of the arm lasted four days. In spite of its apparent disappearance a certain amount of difference in power could be observed between the affected and unaffected sides. The second and third attacks were of similar nature; they occurred five and seven months respectively after the first attack. The last one occurred three years ago and since then no disturbance of the above nature took place. A close examination reveals even at present a slight difference in the dynamometric power of each hand; the knee-jerk is more easily brought out than on the opposite side; stroking the sole of the foot is followed by no response at all, while by distinct downward flexion on the opposite side. The paradoxical sign is distinct on the same side.

The other and the last patient presents an identical history except that he has had four attacks within 3 years. There has been no recurrence for the last two and a half years. He shows the same difference of power and reflexes of both sides as the other patient.

A close analysis of both groups of cases demonstrates one common fact that besides embolism, thrombosis and hemorrhage which are considered as the classical causes of apoplectic strokes there is also a condition which is of hemiplegic or hemiparetic character, but which is produced not by a material lesion of the bloodvessel, but by such a functional disturbance of the vessel wall as to interfere with the circulation and therefore with the function of the nerve tissue supplied by this bloodvessel. The temporary character of this disorder of function, the prompt or rapid recovery from the interfered function, finally and especially the intermittence and frequent repetition of the attacks—all these facts speak in favor of a condition which is totally different from a material obstruction of a vessel with an embolus or thrombus or from a hemorrhage.

In the introductory chapter of the subject the question of spasmodic contractions of cerebral bloodvessels was discussed. Experimental and anatomical proofs were brought forward to

substantiate the existence of a vasomotor display in the brain and therefore alternate contractions of the cerebral vessels are a phenomenon that must be considered as existing beyond any doubt. It is well here to call attention to additional evidence. Lindsay Steven⁷ speaks of a case with spasmodic contractions of the brain vessels and post mortem no arterial disease was found but an area of white necrosis was distinct in close vicinity of the bloodvessel.

The above cited groups of cases show that intermittent closing and opening of the cerebral vessels are the only possible explanation of the temporary paralysis. Hemorrhage, embolism and thrombosis could not possibly be taken into consideration in the production of brief and intermittent attacks. Laceration and softening of the nerve tissue would follow if those factors were at work. As such conditions cannot be restored, permanent paralysis is the usual outcome. None of my patients presented valvular disease of the heart, so that the question of embolism could not be entertained. Besides, that emboli could be swept away in such a short time as the disappearance of paralysis occurred and that embolism could be repeated so frequently—all this would be most unusual phenomena. The same remarks may be made with reference to thrombosis as well as to hemorrhage. Moreover, none of these material lesions could possibly explain the sensory, viz., paresthetic, strokes which occurred so frequently in the early periods of the malady. It is apparently evident from the foregoing that we are dealing here with an irritable state of the vessel wall which leads to repeated sudden occlusion of a bloodvessel and to suspension of function of the parts supplied by it because of local ischemia. The eventual histories of my cases show, especially in the first group, that after a certain number of brief attacks have occurred, the subsequent ones show a tendency to a greater duration and when the latter takes place, the morbid motor phenomena become more conspicuous. The weakness in the limbs, the increased tendon reflexes, the toe phenomenon are all distinct and quite marked. It seems that repeated suspension of function of the nervous tissue led to a real damage, not great though, nevertheless, sufficiently pronounced to increase the functional disability of the affected limbs. Finally the last attack in the cases of the first group rendered the condition permanent.

⁷ Proceedings of Royal Society, 1907, 1, Med. Sect., p. 116.

The gradual evolution of the manifestations, the mild character of the strokes at first, the gradual increase of the paralytic condition in subsequent attacks, the termination by serious strokes leading to permanent disability, finally the autopsy findings almost identical in all the eight cases—all these features permit to draw this conclusion that the intermittent spasmodic contraction of the cerebral bloodvessels gradually led to a destruction of the tissue supplied by them through a process of softening. The localized ischemia produced by the bloodvessels, no matter how brief it may have been, is not a matter of indifference to a highly organized substance as the nervous tissue. It would be a matter of great importance if more numerous autopsies could be secured at the time when only mild or very mild strokes occur, such as we see in the case reported by Lindsay Steven.⁸ A better conception could be formed of the nature of the pathological process which the nervous tissue is undergoing then.

When we attempt to consider the causes of temporary or transient contraction of the bloodvessels which lead to local ischemia, we must bear in mind a number of factors. The phenomenon is observed in compression of the vessels of the neck, in uremia, in cases of narcotic poisoning, in tumors, finally in degenerative states of the bloodvessels produced by syphilis or arterio-sclerosis. In my series of cases arterio-sclerosis was evident in almost every instance. Syphilis, alcoholism and lead intoxication observed in some of these cases have been potent factors in the arterial disturbances. Arteries of such individuals are placed in most favorable conditions for degenerative changes. An irritative state is easily brought on. With years a diseased condition of the vessel walls is established with the result of final thrombosis. Softening or hemorrhage is the inevitable outcome in cases where the arteries are of this character.

My patients of the second group who are still living present practically the same fate as those of the first group. Two of them have already entered the period of permanent hemiparalysis. The other two are still having intermittent attacks, each of which assumes a more and more serious aspect. All the four patients are advanced in years, their arterio-sclerosis is quite conspicuous. The last two patients are evidently threatened with a final attack which will render them completely hemiplegic. The histories of

⁸ Loc. cit.

all my patients demonstrate the fact that brief attacks of apoplectiform nature which repeat themselves in the life of an individual from which he recovers partially or completely, are an indication first of an unstable irritable state of the cerebral arteries, next of an imminent permanent hemiplegia which will eventually occur in the life of such an individual. The intermittent apoplectiform attack could be considered as premonitory signs and warnings of eventual complete occlusion of the cerebral vessels by a diseased process gradually developing in the vessel walls themselves.

This consideration of the pathogenesis of the diseased process under discussion must naturally influence the practical side of its therapeutics. From the foregoing remarks we can readily see that diminution or possible avoidance of arterial irritability is the prime factor in management of cases of this character. But here we enter into a domain of metabolic changes, of accumulation of toxic products in the organism, into a domain of food, of drink, of habits, of hygienic and dietetic elements in general, of excesses physical and mental. But these purely therapeutic features, as well as administration of certain drugs such as nitrites, iodides, salvarsan, etc., are too well known factors in the management of circulatory organs to require any special comment. Preventive measures in this particular direction are perhaps of greater importance with regard to the pathological conditions under discussion than in many other forms of human ailments.

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APRIL 7, 1914

The President, DR. SMITH ELY JELLIFFE, in the Chair

THE CHRONIC PROGRESSIVE CEREBELLAR TREMOR (PRELIMINARY REPORT)

By J. Ramsay Hunt, M.D.

Dr. J. Ramsay Hunt said that under the title "Progressive Cerebellar Tremor" he would direct attention to a group of cases which he believed belonged to a definite and undescribed *clinical type* of nervous diseases. Three cases of this affection had come under his observation, two of which had been under treatment for a considerable time. The third was of more recent date and would correspond to an earlier stage of the disease.

In the outline of the clinical picture, the two advanced cases only would be considered, in which the disease had been constant and progressive over a period of six years. The affection began in one of the extremities, either the arm or leg, as a volitional tremor of the *intention type*, which very gradually increased in intensity. After an interval of a year or more a similar tremor developed in another extremity and progressed in the same gradual manner as in the limb which was first affected. A year or so later the other portions of the body were gradually involved, so that in the course of from three to four years the head, trunk and extremities presented the clinical picture of a coarse, volitional tremor. The tremor was increased by all movements, however slight, and by any excitement or mental activity. It ceased during sleep, and was always greatly diminished by rest in a relaxed or recumbent posture and usually ceased entirely in this position. Some slight rhythmical tremors of the head, hand or foot occasionally persisted even during rest in the recumbent position. It was distinctly a volitional tremor, and any attempt at a coördinated movement directed towards some object produced an increase of the shaking and that atactiform tremor which we associate clinically with multiple sclerosis. The tremor movement was slow and coarse, and averaged from three to five vibrations a second. The rate and amplitude were both increased by voluntary movements and by excitement. It was not affected by closure of the eyes.

The gait was jerky, uneven and dysmetric, the smooth harmony of movements being interrupted by coarse irregular tremors of the head, trunk and extremities. There was no ataxia, either kinetic or static. The equilibrium was easily maintained with the eyes open or closed, even when the whole body was in a state of shaking and oscillation. The speech was

slow and scanning, with a tendency to explosive utterance, or it was simply slower than normal. Finer movements of the hands were rendered impossible, so that eating and drinking were difficult, and the handwriting became an irregular scrawl. There was no paralysis, no sensory disturbances, and all the tendon and skin reflexes were present and normal. There was no loss of the perception of weights. The speaker especially emphasized the preservation of the abdominal reflexes, and the normal flexor type of the plantar reflex. The pupils were equal and reacted normally. There was no true nystagmus. Occasionally, when the head tremor was active and it was mechanically checked by holding, the tremor overflowed and appeared in the ocular muscles. When, however, the eye fixed and followed an object, there was no nystagmus. There were no explosive emotional attacks, nor crises of laughing and crying; no diplopia, no vesical trouble, visual disturbances nor other signs of multiple sclerosis. The optic discs were normal, as were the other cranial nerves. Memory was intact; there were no unusual states of depression or exaltation, and there were no evidences of mental deterioration. There were no pigmentary deposits of the cornea as have been noted in some cases of pseudo-sclerosis.

Headaches occurred before the onset of the tremor, and from time to time since. These were chiefly frontal, not of great severity and not accompanied by nausea or vomiting. There was no true objective vertigo, but in the erect posture, when the oscillation of the head was pronounced, subjective sensations of vertigo and giddiness occurred. There was no history of epileptiform seizures, cerebellar fits, or vestibular attacks. The Wassermann test for blood and cerebrospinal fluid was negative, and there was no increase of albumin nor cells. The blood was normal, as was the urine, and the general visceral examination was negative, excepting for a small, firm enlargement of the thyroid gland in one of the cases, without symptoms of Graves' disease. There was no history of trauma, nor symptoms indicative of hysteria. Except for the coarse, progressive tremor, which gradually and successively involved one extremity after another, the only other symptoms indicating an organic disease of the nervous system were the following, and these may be referred to a disorder of certain functions of the cerebellum.

The adiadochokinesis of Babinski was distinctly present on both sides. There was also a hypotonic state of the muscles, as indicated by flaccidity and softness of the muscular tissue of the extremities, relaxation of the joints and the presence of the Stewart-Holmes sign of hypotonia (failure of the rebound or movement of extension when flexion of the arm has been resisted and is suddenly released). Mechanical and electrical excitation of muscles was normal.

In addition, certain symptoms indicating asynergia and dysmetria were also present, i. e., a failure of the harmonious grouping of the movements concerned in a coördinated act. This was especially marked in the upper extremities. While there was no weakness or paralysis of the muscles in the ordinary sense, there was demonstrable an *intermittent asthenia* of a peculiar character, which consisted in the inability to sustain the muscle contractions of a voluntary movement except for a brief period of time. For instance, if the patient grasped the hand of the physician and was instructed to sustain the contraction, even with special effort, relaxation took place in a few seconds and the grip loosened, and another attempt

would be made only to suffer the same spontaneous relaxation. This could also be demonstrated in dorsal flexion of the foot and flexion of the arm. The author ascribed this to a defect in the mechanism regulating muscle tonus, and it was, in a way, the reverse of what Babinski had described as cerebellar catalepsy, in which the power of fixation was greatly increased when a limb, by an effort of will, was held in a certain position. The Barany "pointing tests" had been unsatisfactory and difficult of interpretation because of the coarse atactiform tremor on intention. The caloric tests show the integrity of the vestibular apparatus.

To summarize briefly, this clinical type, which was considered worthy of differentiation, was characterized by a chronic, gradually progressive tremor, coarse and irregular in character, associated with symptoms of asynergia, hypotonia, adiadochokinesis, and the *intermittent asthenia*, an inability to sustain fixed or continuous muscle contractions. All of these symptoms were referred to disturbance of the cerebellar function.

In the differentiation of this condition, the so-called hereditary or essential tremor may be excluded by the absence of a hereditary or family tendency to tremor, by the slow method of progression, successively involving one extremity after another, and by the associated symptoms of a cerebellar affection. The "tremor type" of Parkinson's disease may be ruled out by the disturbances of tonus, which differs fundamentally from the rigidity and hypertonicity of that disease. There are none of the symptoms which would justify a diagnosis of hysteria, a traumatic neurosis or the pseudo-sclerosis of Westphal.

The author realized that in the absence of any pathological support to the contrary, the question of multiple sclerosis was an important one in the interpretation of this group of cases. If the underlying lesion was multiple sclerosis, this group deserved a place among the recognized clinical types of that disease. As, however, all the symptoms indicated a disturbance of the cerebellar function, and were slowly progressive, he would regard these cases as representing a well defined and progressive disease of some portion of the cerebellar mechanism. The clinical type he would designate as the *chronic progressive cerebellar tremor*.

It was suggested that such cases had probably been variously classified as hereditary or essential tremor, multiple sclerosis, hysterical tremor, traumatic neurosis and atypical paralysis agitans. The reports of three cases were given.

INSANITY AMONG JEWS. IS THE JEW DISPROPORTION- ATELY INSANE?

(PRELIMINARY COMMUNICATION)

By A. A. Brill, M.D. and M. J. Karpas, M.D.

Dr. A. A. Brill and Dr. M. J. Karpas presented a joint paper on this subject, which was read by Dr. Brill. The authors stated that ever since modern psychiatry came into existence, it had been understood that the Jew contributed more to insanity than any other race. As far as they could ascertain, however, very few investigations had been made along this line, yet when they consulted the works of such eminent observers as Kraepelin, Krafft-Ebing, Weygandt, Arndt and others they found that

they all agreed that the Jewish race was disproportionately afflicted with insanity. However, the opinions expressed by these and many other authors were not fully shared by other investigators. Thus, Sioli states: "All nervous and mental diseases familiar to us occur among all nations of the earth, but we are unable as yet to draw any definite conclusions concerning the frequencies and most manifold appearances of the same." Sichel carries this disagreement still farther, basing his opinion on the record of the Frankfurt Hospital, which shows about the same relative percentage of mental diseases among Jewish and non-Jewish admissions. He also found that the Jews contributed a very small percentage to the alcoholic psychoses.

From the figures available in literature, Dr. Brill said, one could readily see that the sweeping statement made by so many that the Jew was disproportionately afflicted with insanity had never been confirmed by careful statistical data. All that one could say from the material at hand was that the Jewish, like any other race, contributed a higher quota to certain forms of mental diseases. With the object of throwing some light on this question, the authors examined the statistical data of the admissions to the Manhattan State Hospital for the four consecutive years, beginning October 1, 1908, and ending September 30, 1912. The total number of admissions was 5,710 (2,803 men and 2,907 women), of which there were 1,203 Jews (588 men and 615 women). The Jews thus constituted 21 per cent. of the total admissions.

From a careful study of the diagnostic grouping of the Jewish patients, one could readily see that the predominating psychoses among them were of the functional type. Thus, the highest percentage was found in the manic-depressive group, and second in order was the undifferentiated depressions, the greatest majority of which belonged to the manic-depressive class, and third in order was the dementia præcox group. The relatively high percentage of the imbecility and constitutional inferiority groups might be explained by the fact that these diagnoses were only too often made when a foreign Jew was examined by a physician who was unfamiliar with his language and racial characteristics.

The relatively high percentage of the infective exhaustive groups in men may be partially attributed to the poor hygienic conditions at home and in sweat-shops.

It was interesting to note that the general paresis group showed a comparatively high percentage. This condition was also found by Hirschl, Pilcz, Benedikt, Beadle and others whose material came from large cities. The Russians, however, found a very low percentage of general paresis among Jews. The explanation lay in the fact that in Russia the orthodox Jews were in the majority, and owing to their rigid religious tenets and early marriages, they led a pure sexual life. The senile and epileptic insanities and psychoses accompanying organic brain diseases showed a relatively low figure, and the alcoholic psychoses represented only 2.5 per cent. of the male alcoholics: there were none among the female admissions. This concurred with the results found by all investigators on the subject.

The authors stated that in order to correlate their data, they obtained an official estimate of the population for the boroughs of Manhattan and Bronx, as given by the New York Board of Health for the years 1909 to 1912, inclusive, and compared the same with the total insane population of the psychopathic pavilion of Bellevue Hospital for the corresponding years.

It was to be noted that the insane admissions to Bellevue were drawn from these two boroughs. By the courtesy of the Federation of Churches they obtained the number of Jews for the two boroughs for the year 1910, and by taking the average of the total population for the four years and subtracting the number of Jews, they found the following results:

Average total population of the Boroughs of Manhattan and the

Bronx for one year (from 1909 to 1912, inclusive)..... 2,829,243
Jewish population for 1910 807,801
or about 29 per cent. of the total population.

Non-Jewish population for one year 2,021,442

The insane population for four years, as taken from the records of Bellevue Hospital, was as follows:

Non-Jews 10,766; average, 2,691 per year.

Jews 3,062; average, 765.5 per year.

The relative percentage of the insane population was .0013 for non-Jews, and .0009 for Jews, or about 13 insane for every 10,000 non-Jews, and 9 insane for every 10,000 Jews, or 1 to 751 non-Jews, and 1 to 1,053 Jews.

In brief, after thoroughly investigating the literature on the subject, the authors were forced to the conclusion that the prevailing belief that the Jews contributed more to insanity than any other race had never been substantiated by detailed statistical data. With the exception of a few investigators, notably Sichel, Kirby and Pilcz, no real effort was ever made to settle this question. Their own findings, based on four years' statistics from the two biggest boroughs of the largest Jewish city in the world, showed that the Jew was not disproportionately insane. They agreed, however, with those writers who claimed that the Jewish race contributed a rather high percentage to the so-called functional forms of insanity. In that respect, however, the Jew did not differ from other races, as there seemed to be a certain selectiveness, even in abnormal reactions, which showed itself in definite forms of insanity. Why the Jew should show a preference for those particular psychoses would form the thesis for future investigation.

Dr. George H. Kirby said the paper of Dr. Brill and Dr. Karpas was of special interest to him, as they had for several years past endeavored to collect careful statistics at Ward's Island regarding the different racial types coming into the hospital. Similar data were now being gathered under the supervision of the State Hospital Commission in all the state hospitals.

Studies in comparative race psychopathology had always seemed to him important, not only because of their purely psychiatric value, but also because of their practical bearing on some of our sociological and economical problems. It was, for example, important to know that the Italians were bringing in more epilepsy than any other race; that the Irish supplied an enormously disproportionate number of alcoholic psychoses, and that the recently arrived Jews furnished a high percentage of dementia præcox, manic-depressive insanity and feeble-mindedness. While the studies so far made showed that these psychopathic tendencies existed in varying degree among the different alien groups, it was much more difficult to determine if insanity in general was more prevalent in one race of mankind than another. Dr. Brill and Dr. Karpas, contrary to certain general

impressions, concluded that insanity was *not* disproportionately frequent among Jews as a race, but that in fact just the opposite was true. Dr. Kirby said he wished to mention one factor involved in this study which he thought threw some doubt on the conclusions reached. To determine the incidence of insanity, one should not compare an essentially immigrant population (such as the Jews in New York) with the native born population. An immigrant population may be variously constituted. It usually contained a disproportionate number of young adults, and the two sexes might exist in unusual proportions. The Italian population of New York had a big majority of young, unmarried men, while the Irish immigration had brought more women than men to this country. On the other hand, the native born population contained from one sixth to one fifth of children, and had, of course, a much larger proportion of middle-aged and old people than did an immigrant population. The age periods were, therefore, very important in determining the incidence of insanity in any group of people. One reason why dementia præcox and manic-depressive insanity were relatively more frequent among Jews admitted to the hospitals than the native born was because there were relatively more young adults in the Jew population. As the average age of the immigrant population increased, there would be more cases of paresis, and, later still, more cases of arteriosclerosis and senile dementia to record among the Jews.

The speaker said that to his mind, more reliable comparisons were those contained in the figures which the authors of the paper quoted from the Russian sociological study. We had there a native Russian population compared to a native Jew population, and the figures were practically equal, the Jews showing only a slightly higher percentage than the Russians. If, however, the multitude of cases of dementia præcox and manic-depressive insanity among the Jews in this country had remained in Russia to be included, the percentage would have probably been even higher for the Jews.

In regard to feeble-mindedness, a great deal of the data available indicated that it was proportionately higher among Hebrews than other races. Among all the cases of imbecility admitted to the Manhattan State Hospital during the past four years, 50 per cent. of them were Jews, whereas this race constituted only 21 per cent. of the total admissions. Some studies made in the New York City schools showed a high percentage of Hebrew pupils in the classes for defectives. With 10 per cent. of the children of native parentage, there were 40 per cent. of Hebrew parentage: more Hebrew children, in fact, than there were Italian, German, Irish and negro children combined. At Ellis Island the number of defective Hebrews excluded had been remarked upon; the figures showed that nearly 33 per cent. of all the immigrants certified as mentally defective were Hebrews, whereas this race furnished only 14 per cent. of the total arrivals.

The President, Dr. Smith Ely Jelliffe, said the general attitude toward any statistical problem was one that was extremely difficult to grasp. Statisticians who followed work of this kind as a profession seemed to feel that the average question could be satisfactorily and definitely solved by figures, and they were apt to ignore certain facts tending to show that such figures, taken by themselves, were of rather superficial importance. Dr. Kirby had emphasized the fact that from the bare recitation of a series of figures we were not warranted in drawing any definite conclusions as to the broader aspects of this problem. Sociologic and economic

questions, the transplantation of families, educational factors—all these had to be taken into consideration in trying to solve this problem of the comparative prevalence of insanity among the Jews or other race.

Dr. Morris J. Karpas stated that the statistical data in the paper were obtained from the Manhattan State Hospital and the psychopathic department of Bellevue Hospital; the former aided them in the study of various forms of mental diseases occurring in the Hebrew and the type of predilection of certain forms of mental diseases; the statistics from the latter prove that the ratio of the Jewish insane to the Jewish sane population was not so high, and since Jews inhabit large cities, New York formed an invaluable source of information for the study of race psychopathology, particularly in Jews. However, he felt that the figures were by no means absolute; but they formed an invaluable index by which one could gauge the insane population and furthermore be guided in future studies along the same lines. He also felt that the large number of so-called mental defectives among Hebrews excluded at Ellis Island was not at all conclusive, inasmuch as the medical examiners there were not familiar with the language and racial characteristics of the class of immigrants they were dealing with. One must bear in mind that feeble-mindedness, excluding the well-defined cases of idiocy and imbecility, is purely relative, and before one can diagnose a case of mental retardation, it is necessary to take into consideration the individual in relation to his heredity, environment and intellectual training.

Dr. Brill said he realized that the criticisms made by Dr. Kirby and Dr. Jelliffe had some basis, but when one came to investigate the statistics that had been given by various other writers to prove the converse of this contention, namely, that the Jews did contribute more to insanity than any other race, one would find that their deductions were based largely on hearsay, while the conclusions drawn concerning the number of insane Jews in Manhattan and Bronx were based on actual figures. In this paper, Dr. Brill said, they had confined themselves to the question of disproportionate insanity among Jews, and had not taken up the various psychoses, as such; feeble-mindedness without insanity was not considered at all, as that class of cases will be investigated and reported at some future date. It was practically impossible, of course, in a study of this kind, to select the cases from the general population at various ages, or to learn how recent or remote their arrival in this city had been. While such a selection might have had some influence upon the results, it would probably have been comparatively trifling, and the percentages would have remained practically unchanged.

Dr. Maurice Fishberg (by invitation) said that great care must be taken in interpreting the statistics of insanity—in fact, more discretion was necessary than in interpreting dreams. Ninety-five per cent. of Jews were city dwellers as against only 33 per cent. of non-Jews. Urban dwellers had a higher incidence of insanity, and must commit their mental defectives to institutions, whereas in rural populations the rates of insanity were lower and the milder forms of mental alienation were permitted to roam about. The Jews were engaged in financial and commercial pursuits in much larger numbers than the Christians, and this had an influence in the direction of increasing the number of insane among them. It was, however, impossible to determine the exact proportion of insane Jews in New York, because we had no reliable data as to the actual number of Jews, all the so-called estimates being merely guesswork.

As to the statement that 40 per cent. of the pupils in the ungraded classes in the schools of this city were of Jewish descent, the speaker said this did not at all prove that there was more feeble-mindedness among them than among others. Jewish parents were more apt to send their children to school, while other immigrants often used every possible effort to evade the compulsory education law.

Dr. Fishberg emphasized the fact that while studying these problems, one must be extremely careful in the compilation of statistics. While preparing a monograph on the ethnic characteristics of the Jews, he had carefully scanned the literature, which was more extensive than the readers of the paper seemed to be aware, but he could arrive at no positive conclusions. In the official statistics of Austria, Hungary, Germany and some other European countries there was much data about conditions extending over long periods of years, yet it seemed that the question whether insanity among the Jews was more frequent than among others, and whether there was such a thing as a *psychosis judaica*, or whether certain forms of mental alienation were more apt to occur among them than among non-Jews, had not yet been settled. It all depended, it appeared, on the frequency of the factors instrumental in the etiology of insanity, such as alcoholism, syphilis, precarious occupations, such as banking, mercantile pursuits, etc. That there were no race factors at work was evident from many peculiarities, and this was best illustrated by the frequency of suicide among them. Half a century ago a Jewish suicide was extremely rare, while at present there were more Jews who voluntarily ended their life in Germany and also in New York than others. Ethnic traits did not change within one or two generations.

Dr. Fishberg showed that the statistics from Russia quoted by the reader of the paper were of no value, because census statistics had never been taken seriously in that country, and, in addition, the Jews there kept their insane at home, excepting in very severe cases, and hence they were not counted in the asylum population. The figures presented by Dr. Brill about conditions in New York were not carefully compiled, and might be interpreted in many ways. Mere figures were of no value: statistics were always comparative.

THE AUTONOMIC RECIPROCAL ACTIVITIES OF BRAIN AND VISCERA

By Walter Timme, M.D.

Dr. Walter Timme presented a paper on this subject. He said a decade had now passed since Langley and the English school had contributed to our knowledge of nervous anatomy and physiology a comprehensive plan of the structure and workings of that part of the nervous system which supplied the smooth muscle fibers of the body, the cardiac muscle and the glandular tissues, and to which they had given the broad term autonomic system. This was so-called from the fact that it acted independently of the cerebrospinal system, and still there seemed to be confusion not only in the nomenclature, but also in the interpretation of the many experiments that had been made by various investigators in this field of research.

Dr. Timme then briefly sketched the anatomical characteristics of the autonomic system, from which we saw that the viscera generally had a

double nervous supply: one from the sympathetic *via* the vertebral and prevertebral ganglia, and the other from either one or the other of the autonomic divisions. These two sets of nerve fibers conveyed a continuous stream of current to the tissues, but from the probability that their end organs in the tissues were different from one another, class for class, their effects upon the viscus were of a balancing character. As a result, the activity of the organ was commensurate with the work that in a given case was required of it, the repair and growth of its cellular elements controlled, the blood supply properly limited; and all these various activities were constantly at work, independent of our will, and, indeed, largely of our consciousness. But such a compensating balancing mechanism was dependent upon many factors other than these, and yet upon factors that were influenced *indirectly* by the will and consciousness, so that if one set of fibers was depressed, the other overacted its part, and the converse. But it would seem that if one set was entirely destroyed, the other, having no physiological antagonist, ceased its influence.

We all knew that various associations produced autonomic effects without our will, and it was reasonable to suppose that if we could recall these associations through our will, the same autonomic effects would be produced. Joy caused a rapid heart action; shame was accompanied by blushing; fear sent the blood from the face and lips and dried the mouth; psychical irritation may cause vomiting or asthma or diarrhea, and sexual excitement was followed by erection. Any of these effects could be reproduced by calling up the associations which accompanied their presence at some previous time, so that only indirectly could the will control the autonomic mechanism—a far different matter from the voluntary absolutism over the cerebrospinal. Many attempts have been made to trace anatomically the path of influences from the cortex and other cerebral areas to the bulbar and spinal sympathetic nuclei, and on the other hand the tract of the painful and other sensations from the viscera to the cortex, but the sum of our knowledge at present is merely that there exist certain areas in the brain whose stimulation produces certain activities in the viscera. For example, there is a point in the hypothalamic region which, when irritated, produces dilatation of the pupil (Kreidl). The floor of the third ventricle contains an area which partially controls the sugar tolerance; bladder contractions may be called forth by stimulating a part of the hypothalamus; but these results are quite isolated and want further proof. As for tracts of conduction for these impulses, we simply knew that the cervical sympathetic and the superior cervical ganglion were the carriers of the current from the cerebrum and midbrain to the ciliary muscle influencing the tone of the pupil. The other question, the manner of conduction of painful impulses from the viscera to the cortex, was explained by many—Sherrington, Muller, Head and others—as due to the process of “irradiation” from the termination of the afferent autonomic fiber in the spinal ganglion to the spinal afferent nerve in juxtaposition to it, and thence to the cortex.

We have now seen in the lowest vertebrate type, the amphioxus, in the mammalian cat and in the human being, based upon embryological development directly observed, upon physiological and pathological experimentation, upon clinically observed facts and upon pharmacological experience, that there was a close relationship between the activity of the brain and that of the viscera, and that in spite of the autonomicity of the one

and the primacy of the other, each was complementary to the other in a broad sense, and depended upon it for its own normally functioning existence.

Dr. Theodore H. Kellogg presented a memorial of Dr. Ralph L. Parsons.

IN MEMORIAM DR. EDWARD CHARLES SPITZKA

By N. E. Brill, M.D.

By the death of Dr. Edward Charles Spitzka, medical science has lost one of its most brilliant votaries, and the New York Neurological Society one of its oldest and most productive members. In the early history of the growth of this Society he contributed more to make it a permanent success than any single member.

He was born in New York City on November 10, 1852. His father, a most skillful maker of watches, of clocks and instruments of precision, a man of broad attainments and large reading, was early involved in the Revolution in Germany in 1848, whose cause he actively espoused, and on account of which he was compelled to flee. He emigrated to America with a large number of similar refugees. In him prevailed a stern and strict sense of justice and of personal liberty, which were transmitted to the son. Shortly after his arrival in this country with his wife, the son was born. The parents realized the advantages of the system of public instruction of that time and sent their boy to the, perhaps, most famous of the New York public schools, No. 35, whose "principal" was the well-known Thomas Hunter.

The son made rapid strides in his studies, and at a very early age entered the College of the City of New York. He also early manifested the same voracious appetite for reading which characterized the father, and readily acquired a large amount of general knowledge. He soon evinced a definite preference for the natural sciences, and became especially interested in the subjects of biology, geology, and paleontology. Whatever information he could acquire from books on these subjects, he acquired. These studies so fascinated him that he determined to take up the study of medicine. With this in view, he became a student in the medical department of the University of the City of New York. Even while pursuing his medical studies he kept up his reading in the subjects previously mentioned. Thoroughly acquainted with everything written by Darwin, Wallace, Huxley, Spencer, and Tyndall, he was requested by his classmates to give them a lecture on the subject of "Evolution," to which he readily assented, much to the delight and edification of his classmates, though little to that of some of the members of the faculty.

After his graduation from medical school he went abroad for the purpose of further study. He proceeded to Germany and settled in Leipsic. There he came under the influence of Wagner, von Coccius, His, Wunderlich, and Thiersch. Even while studying medicine in Leipsic he found time to pursue further his work on history and philosophy. After leaving Leipsic, he went to Vienna, where he met the man who had the greatest

influence in determining his future career, namely, Meynert. Under that most renowned anatomist and psychiatrist he accumulated a wealth of anatomical, physiological, and pathological knowledge which became the foundation of the most of his subsequent claims to fame. In some respects Spitzka resembled his great teacher and master, Meynert, especially in the possession of a vast fund of general information, and particularly in a thorough acquaintance with the facts of comparative anatomy, in which the pupil was as well informed as the master. While in Vienna he also became interested in the subject of embryology, human and comparative, whose study he followed under Professor Schenk, who, recognizing the worth of his scholar, appointed him, with the consent of the authorities of the university, an assistant to the chair of embryology. Spitzka remained abroad altogether three years, during which time he had not an idle moment, after which he returned to the city of his birth.

Shortly after his return, in 1876, he began the collection of whatever neurologic, pathologic and anatomical material he could obtain, chiefly from the public and the private asylums of the city and its environs, and commenced his anatomical, neurological, and psychiatric investigations, for which we do honor to his name to-night.

About this time he joined the New York Neurological Society, and became one of that coterie of pioneers of neurological science in New York, among whom were Seguin, General Wm. A. Hammond, Thos A. McBride, as active workers. He not only contributed to the scientific programs of this Society, but gave the results of those investigations in neuro-anatomy, in clinical neurology, and in psychiatry, for which he has secured for his name a lasting place in the history of those sciences. This period marks the beginning of his greatest discoveries.

His was a dominating, overpowering personality. Endowed by nature with an unusual capacity for work, gifted with the most extraordinary powers of analysis, possessing a memory so retentive that it seemed almost supernatural, for nothing he ever read was ever forgotten, and withal, a fluency of thought and facility of speech, he was equipped with advantages whose like is seldom possessed by any single individual. To these attributes was brought an exceptionally creative and vivid imagination, which suggested and initiated a great deal of the work of his active mind. It is easily conceivable how endowments of this nature result in an abundantly productive creative work; therefore it is not to be wondered at that the productions of his pen were varied and numerous. His facility in writing even eclipsed the ease and fluency of his speech. He did not permit fatigue to limit the amount of the work which he had outlined for himself to do; and he used his physical powers, which he did not spare, to their utmost extent, even to the limit of exhaustion.

He was a seeker after truth, and content with investigations only after they had satisfied all of the requirements of established facts, logic, and pure reason.

He was interested in many fields of human thought and knowledge and generously contributed to both. Nobody except those who had been intimate with him could realize the extent and breadth of this knowledge. Possessing the use of many languages, thoroughly acquainted with history, knowing the literature of the people whose language he spoke, expert in all the branches of biological science, he was easily one of the most versatile members of the medical profession. This versatility shows itself

in his writings, which embrace the departments of history, biology, paleontology, criminology, forensic medicine, and neurology, including neuro-anatomy, neuro-physiology, neuro-pathology, and psychiatry. Possessed of unusual powers of thought, equipped with a wealth of general knowledge, almost encyclopedic in its diversity and extent, he gave his best to the advancement of neurologic and psychiatric science.

His work will be judged by medical men chiefly on account of his contributions to the last-mentioned subjects. These contributions to medical sciences were very numerous, many containing original discoveries and new viewpoints. His published writings in these subjects alone number over two hundred, as far as I have been able to gather them. These embody many entirely new discoveries and original points of view that made the sciences of neurology and psychiatry distinctly the gainer. For the sake of assisting in the preservation of his labor, I have summarized in the form of a "bibliography" all the contributions to the medical sciences, which have emanated from his pen.

It is rather difficult to decide whether neurology or psychiatry is the greater gainer by his work, because he was a valuable contributor to both. He gave to each many new conceptions which, without doubt, tended to advance our knowledge. In neuro-anatomy his name will be perpetuated by his discoveries and it will live as long as the science, for it owes more to him than to any other individual in America. The same may be said, also, about his relation to psychiatry. In the latter science he was a pioneer, who placed it, in this country at least, on the plane of a true science. In its dissemination he brought to bear all the clinical experience which he had accumulated under Meynert in Vienna, under whom he had worked for a considerable time. When he left the inspiring and forceful influence of his teacher, he was indebted to him for much of the intimate knowledge, as far as was then known, of the mechanism of the function of the brain in health and disease. He was also the first to introduce into America an adequate conception of the scope of a true psychiatric science. Up to that time the study of mental disease in this country was based on an empirical foundation for the most part; the pathological basis of the subject was but imperfectly known or even studied in general. It was to his influence that the more serious study of the subject was taken up. Asylum superintendents, especially, were indebted to him for turning them aside from preconceived notions, and for instructing them in methods by which they might acquire a more useful knowledge of mental disease. He very soon after his return came to be recognized as a force and factor for progress in both neurology and psychiatry. It did not take long before his reputation became a national one, due in some measure to the fact that the trial of the assassin of President Garfield was then imminent. This murder of the President of the United States had stirred the country to the deepest depths of emotional fury. There was an almost universal cry for the sacrifice of the assassin, Guiteau. Spitzka, with a courage which was the result of a nature which could not tolerate falsehood, and convinced of the fact that the murder was the work of an insane man, did not hesitate to give his testimony to that effect. Arrayed against his opinion was that of the most of the so-called experts of that time. Nothing daunted, he testified to the truth, as he saw it, a truth which time has finally firmly established. This event in his early life—he was at that time only twenty-nine years old—is mentioned, because it indicates the most

dominant characteristic in his organization, viz., the desire for truth, no matter what the consequences. One can imagine the courage he possessed, when one becomes acquainted with the fact that his life was threatened, that he received letters warning him that if he gave testimony to the effect that Guiteau was insane his own life would be sacrificed.

The great influence which he exercised in the field of psychiatry was best shown in his book, a "Manual of Insanity," which went through two editions. It became the text-book of many of the teaching institutions of this country, as representing the standard of the advanced psychiatric knowledge of the time. It became the "vade-mecum" of many of the asylum superintendents, and it established his position among that body as an independent and truly scientific observer. The book embodied the study of all the large amount of pathological material which he had collected. Part of this had been previously used by him in the preparation of an essay, which had earned for him the W. and S. Tuke Prize, given through the British Medico-Psychological Association, and which had been open to international competition. This essay was entitled "The Somatic Etiology of Insanity."

No estimate of the worth of Spitzka would be complete without the mention of the overpowering personality of the man. Everybody who came within his influence immediately recognized that he was in the presence of a man of unusual force and power of mind. The very fluency of thoughts, each following the other with marvellous rapidity, embodying many striking generalizations, kept the attention of the hearer riveted. Each spoken thought suggested another to his mind, all of which were well expressed in choice diction, and all were worth listening to, for very little that Spitzka said was valueless. These two unusual attributes of mental power, viz., the control of all his information so pigeon-holed in his mind as to permit of ready generalizations, and secondly, the suggestiveness of his thoughts were the most characteristic, perhaps, of the mental powers of Spitzka. They were certainly remarkable gifts and endowments, which stamped him as belonging to the rare personalities of the race.

Those who knew him will ever testify to his strict sense of justice, to his undeviating pursuit of truth, to his contempt of falsehood and of all sham. He could not brook hypocrisy in any guise and with powerful invective attacked all those who attempted to foster it.

Let us remember him for his many sterling qualities and for his exceptional ability, and bear tribute to his memory by adopting the following resolutions:

Resolved, That the New York Neurological Society has learned with great sorrow of the death of its member and former President, Dr. Edward Charles Spitzka;

That it desires to place on record the expression of its appreciation of the very great value of the services rendered by him to the New York Neurological Society and to medical science, especially to Neuro-Anatomy and to Psychiatry;

And therefore it orders that a minute of this resolution be inscribed on its records, that a copy of it be sent to the medical press, and that a copy, suitably engrossed, be sent to the family of the deceased.

THE PHILADELPHIA NEUROLOGICAL SOCIETY

FEBRUARY 27, 1914

The President, DR. CHARLES K. MILLS, in the Chair

Dr. Charles K. Mills read a paper on "The Different Theories of Aphasia, Can They Be Made to Harmonize?"

Dr. F. X. Dercum read a paper on "The Clinical Interpretation of Aphasia."

Dr. Charles W. Burr read a paper on "The Relation of Aphasia to Mental Disease."

Dr. J. Hendrie Lloyd read a paper on "Sensory Motor Aphasia."

Dr. J. H. W. Rhein read a paper on "Apraxia in Relation to Aphasia."

Dr. T. H. Weisenburg read a paper on "Anarthria."

Dr. William G. Spiller gave an exhibit of brains from cases of aphasia.

Dr. Alfred Gordon said that the subject as it stands at present means a controversy between the classical idea of aphasia and the newer ideas of Marie. Marie unquestionably threw, although not intentionally, considerable chaos into the question of aphasia; the latter became considerably confused. Dr. Gordon said he believed the subject would be settled in time and only by anatomical studies. Clinical studies alone are not sufficient and by trying to harmonize the pathological specimens with the clinical histories is the only way the question could be decided. Dr. Gordon spoke of three cases, the specimens of which were in his possession, which would show as they showed to him, the difficulty of reconciling the old classical ideas with the newer ideas and that the matter still remains unsettled and only by cumulative evidences, by a very large number of cases, could the question be settled. One case was a tumor in the left hemisphere wedged in between the frontal lobe and the insula; it was a very large sarcoma, so large that it flattened the frontal lobe and flattened the insula. Consequently it flattened and almost destroyed Broca's convolution. When an antero-posterior section was made it was found that the lesion extended into the substance of the brain, destroyed the lateral ventricles, the lenticular and caudate nuclei, the internal capsule, the claustrum, and there was a very marked softening and dilatation of the entire left temporal lobe. That means involvement of Wernicke's area to a large extent. Clinically what do we see? There was no involvement of the motor speech and no dysarthria. We therefore have much involvement of Broca's area, involvement of the entire lenticular zone and still no disturbance of the motor or sensory speech. Here we have evidence against the old classical idea, as well as against Marie's ideas. The second case shows an old focus of softening in the left hemisphere involving the lenticular nucleus and the posterior portion of the internal capsule. Clinically there was only a dysarthria, a condition as it is understood to be a paralytic disturbance of speech. That was the case which confirms the old classical idea and at the same time Marie's view. The third case shows a destruction of the left lenticular zone and of the inferior longitudinal bundle. Wernicke's zone was intact. There was during life some alexia and verbal amnesia. This case is a confirmation of Broca's center and speaks against Marie's view as well as against

Wernicke's zone. These three cases throw the subject of aphasia again into confusion. On one hand, we have evidences in favor, on the other, against Marie's ideas also facts in favor of both views. References to the most recent literature confirm this position. Wernicke's zone, which has been considered for years as a classical sensory area, is now doubtful as such, we have pathological evidence speaking against this conception. An analysis of all these facts leads to the conclusion that there is no one special area for speech. In fact there are many areas. Broca himself did not claim that motor speech was confined exclusively to the third frontal convolution. He said that in the majority of the cases we have the insula as well as the lenticula involved. It is only his followers who confined the speech area to Broca's convolution. Dr. Gordon said it seemed to him that in spite of a number of observations, clinical as well as pathological, the question at present is far from being settled. Marie deserves credit for revising the subject of aphasia and for calling attention to the erroneousess of the old views. A considerably larger number of anatomical and clinical observations are necessary to decide the question one way or the other.

Dr. D. J. McCarthy said that in reference to the discussion of Dr. Weisenburg's paper on Anarthria it seemed to him that anyone who studies anarthria would have very little difficulty in separating anarthria from motor aphasia. In the last year Dr. McCarthy had two cases of lenticular disease. When one follows the development of the anarthria in these cases, the progressive daily development of the disease which goes on from month to month, there is a clear cut separation of anarthria from aphasia. There would be the disturbance of speech, not due to disturbance of actual tongue muscles, a mumbling speech. In paralysis agitans there is at times a similar and complete loss of speech as a clear cut manifestation of anarthria. In reference to the brains showed by Dr. Spiller, Dr. McCarthy said he had one case in his collection at the Pepper Laboratory of a lesion in a motor aphasic which was localized much more clearly to Broca's convolution than in those Dr. Spiller showed.

Dr. Charles K. Mills said that the discussion and the presentation of specimens had, he thought, done something towards elucidating this subject of aphasia. He said he was afraid he had an unfortunate habit of disagreeing with his friends in special ways, that is in regard to scientific matters. He was entirely in disagreement with those pessimistic gentlemen who think the subject of aphasia is in such utter chaos and who convey the idea that comparatively little has been done to elucidate it by the scores and hundreds who have contributed to it. What can be more convincing than the arguments to be adduced from these specimens here persented to-night by Dr. Spiller. Men like von Monakow and Dejerine have each recorded cases with almost exact localization in Broca's area and with the symptoms of motor aphasia. It is up to those who disbelieve to prove the reverse of anything which is inferred by a presentation of this kind. A great deal of this discussion hinges around the question whether there is a pure motor aphasia. Much of the rest, he thought, had been harmonized in this discussion. Dr. Mills said he did not mean to say that you might not have a subcortical motor aphasia, but the point he wished to make was that the phenomena of motor aphasia are cortical phenomena and that there is a cortical motor aphasia, so-called, whether the name be good or not. It is distinct from sensory

motor aphasia and utterly distinct from anarthria, as we all, or nearly all, understand it. It is not necessary to claim, nor did Broca, as Dr. Gordon point out, do this, that the hinder part of the third frontal convolution alone is the speech area; the speech area is the hinder part and the insula and possibly a very anterior portion of the temporal lobe. The center for speech is greater in individual cases according to the language and cultivation of the individual. Broca's center is a language comprehension center in a sense, but when Dr. Mills said that he did not admit the doctrine of Marie's or anyone of those who are so afraid of isolated motor centers

Dr. F. X. Dercum said he thought we ought to strike a balance and see in what we agree. It made him very happy to hear Dr. Mills say that "motor aphasia is a defect of language comprehension." Secondly, Dr. Mills asserted, and Dr. Dercum agreed with him, that aphasia is always cortical; there is no such thing as a subcortical, pure motor aphasia. Dr. Dercum further said he must insist with Dejerine that there is only one sensory aphasia; that the faculty of comprehending written language is only an association of written characters with sound—is only an elaboration of the same thing as sound recognition—is only a part of one general function of language recognition. This position Dejerine maintained clearly thirteen years ago.

Dr. Dercum thought that it mattered very little whether the third frontal convolution plays a part in speech or not, but if it does why is it so difficult to prove? Why is it that up to a few years ago we could count the reported cases of motor aphasia supposedly due to lesion of the third frontal on the fingers of one hand? As a rule the lesion is deeply penetrating. One cannot tell from surface inspection what it involves. The truth is that it is impossible to make a differentiation of localization of function in the vascular crises that occur in the distribution of the middle cerebral artery.

Anarthria is always subcortical. Dr. Dercum did not care how anarthria is subdivided; it certainly is not aphasia.

There is another point in regard to the study of aphasia which Dejerine likewise insisted upon many years ago and that is that in studying the symptoms of a given case of aphasia, we must bear in mind its duration. The symptoms present early may differ markedly from those present years afterward, when reëducation makes the determination of the significance of the lesion found at autopsy extremely difficult.

Finally, Dr. Dercum said—and this sounds like heresy—that a man talks with his right hemisphere as well as his left. Every now and then cases occur which we cannot explain on any other basis. Kurt Mendel reported a case two years ago in which a right-handed patient had a left-sided hemiplegia due to a lesion in the right hemisphere and in which there was present a typical aphasia. In other words, in the speech function both hemispheres play a rôle. It is merely that the left hemisphere being the larger usually dominates the right, and, when suffering from destructive lesion, may inhibit the function of its fellow; at least for a time. Especially in long-standing cases we should take into consideration how far function has reëstablished itself in the right hemisphere.

Dr. J. Hendrie Lloyd said that there was an old classical anecdote about two men who engaged in a dispute over a shield. One contended that the shield was gold and the other that it was silver. Both were right,

because it was gold on one side and silver on the other, and each disputant saw it only from his own side. That is the way it is with our aphasia. Each disputant is apt to see it from his own side. The shield has two sides—one is motor, the other sensory. It is an argument literally about words. There is a sensory and a motor element: hence a sensori-motor aphasia, and the man who ignores either element is in grave error.

Dr. Theodore H. Weisenburg said that he was afraid that Dr. McCarthy must have had temporary aphasia. Dr. Weisenburg said that he did not say that anarthria was what Dr. McCarthy alleged he did; anarthria in the way Dr. McCarthy meant it is no different from the way Dr. Weisenburg meant it.

Dr. Dercum said that the right hemisphere in speech took part where there was a great destructive lesion that inhibited function in the other hemisphere.

POSSIBLE MULTIPLE SCLEROSIS WITH JERKING MOVEMENTS

By Charles W. Burr, M.D.

Dr. Charles W. Burr presented a man who, suffering from some spinal cord disease, probably multiple sclerosis, showed the following curious phenomenon. Whenever he held the arms or legs extended for a few moments they were suddenly and forcibly thrown down, the arms into the lap, the feet to the floor. At the same time there was a jerk of the entire body. The movements looked to be voluntary, but this the man denied and said he could not explain them, but that the arms and legs moved themselves. The patient stated that he had been ill for about fifteen years. His trouble came on a few hours after exposure to extreme cold and began with pain and total palsy in both legs. After about six weeks he could walk a little and then for a time improved rapidly, so that he could walk fairly well. Several years later he began again to have serious trouble in walking, then his arms began to shake and still later he found that he could not hold them extended for more than a few minutes, after which they would, whether he wanted to do so or not, be forcibly jerked to his lap. If he tried to hold a leg extended voluntarily, after a few minutes it was forced to fall in a similar way.

Examination revealed the following. Sitting at rest there was a constant coarse tremor in both hands, made worse by voluntary movement. No tremor of the head or tongue appeared except under emotional or motor excitement. His face was mask-like. On holding the hands extended and on making any voluntary effort with them the tremor was very much increased and soon they were forcibly dropped to the lap. It is impossible to accurately describe this throwing down of the arms. It much resembled the movements present in so-called electric chorea. K. j. plus. Stroking the right sole in the mid-line caused dorsal flexion of foot and extension of great toe. Stroking the left sole anywhere caused same movement of foot and toes. The rigidity was so great in both legs that ankle clonus could not be obtained but Achilles jerk was present. Gait was spastic. Some rigidity in arms. Intention tremor was so marked that he could not touch the nose with the finger. Articulation was normal. Slight

slowness in micturition was present. The bowels were sluggish. There was some wasting in the muscles of both hands and in the calves and thighs. The mental state was normal. The left superior rectus muscle was paretic. Both optic discs were very gray. Wassermann reaction was negative. The urine was normal.

Dr. Burr said that he was not sure of the diagnosis of the organic disease of the cerebrospinal axis, but thought it resembled multiple sclerosis more than anything else. The case was surely not paralysis agitans. As to the curious sudden jerking movements he knew no explanation. He had never seen anything similar to it.

[This case was presented at the October 1913 meeting.]

THE PHILADELPHIA NEUROLOGICAL SOCIETY

MARCH 27, 1914

The First Vice-President, DR. FRANCIS X. DERCUM, in the Chair

ENCEPHALITIS PROBABLY DUE TO GASOLINE POISONING

By Charles S. Potts, M.D.

A man, 45 years old, who had worked for four months filling the tanks of automobiles with gasoline, while at work falls to the ground unconscious. It is ascertained that for two months previous he has suffered from intense headache, vomiting and at times double vision. He was stuporous for several days, and when aroused complained of headache. Examination showed partial ptosis of right eyelid and either loss or weakness of all the other functions of the third nerve on this side. On the left side these movements were all present, but sluggish. There was loss of associated upward movement. The left side was weak and there was a partial Babinski reflex. The gait was cerebellar in type, finger to nose test poorly performed with the left arm, and adiadochokinesis was present on that side.

Continuous improvement took place until about a month ago, when it ceased and the following symptoms now present seem to be permanent: Weakness of the functions of the third nerve in the right side and slight incoördination of the movements of the left arm.

This case will be reported more in detail later.

Dr. S. D. Ingham said this case reminded him of one somewhat similar in a younger patient that he had under observation for about two years, in which the symptoms included a single moderate convulsive seizure, complete paralysis of the lateral associated ocular movements, with preserved convergence and vertical movements of the eyeball. He had acute cerebellar symptoms which prevented him from walking unaided. For a time he had diplopia. From this stage, which came on rather acutely, he gradually recovered and was able in three or four months to walk unaided. The Wassermann reaction was negative in the serum and spinal fluid, and the spinal fluid was normal to cell count. The Noguchi luetin test was positive and a questionable syphilitic history in the father was obtained.

He had a relapse with a more severe condition with hemiplegia from which he partially recovered, then a third attack from which he died and on post mortem there was found a condition of extensive multiple sclerosis. It occurred to Dr. Ingham that possibly in addition to the encephalitis we might consider the diagnosis of multiple sclerosis here.

Dr. William G. Spiller said in acute intoxications we often have pronounced cerebellar symptoms. He was reminded of the acute ataxia of the older German neurologists. The acute intoxication of alcohol is strikingly cerebellar. We speak of cerebellar ataxia as that of the gait of a drunken person. Dr. Spiller had seen a patient under Dr. Edsall's care in the University Hospital who presented marked cerebellar symptoms from poisoning in eating canned salmon. This man had been examined by Dr. Burr.

Dr. Charles W. Burr said as to the intoxication following acute poisoning, the patient Dr. Spiller spoke of came into his hands immediately after Dr. Edsall saw him. It undoubtedly followed food poisoning. The boy was a student in a military academy, and fifteen or twenty persons became acutely ill from eating salmon. One or two, he thought, died. At all events, he was the only one who either did not die in the acute stage or got well very soon. That was three years ago. His ataxia remains until this day and he still has a distinct ataxic gait. Undoubtedly it was from a food poisoning and the only symptoms that he presents to-day, barring some dementia, is his ataxia. Dr. Burr thought intoxication was a very common cause of cerebellar trouble.

Dr. Dercum asked whether Dr. Potts thought the patient he presented had fully recovered mentally and whether he had considered cerebral syphilis.

Dr. Potts said the man was normal mentally. He thought the eye trouble was probably nuclear because it was incomplete. The lesion impressed him as being nuclear rather than in the nerve trunk. The man's habits have been good. He had nothing in his previous history to indicate venereal infection. The Wassermann was negative. His treatment consisted of compound tincture of gentian. Dr. Potts saw no reason to think the case due to syphilis. As to multiple sclerosis: the men engaged in the kind of work which this patient did say it is not uncommon for them to fall over unconscious at times. Of course, we may have remissions in multiple sclerosis, but coming on as acutely as this did and clearing up so rapidly, seems against it. He never had an intention tremor. In regard to Dr. Spiller's remarks, Dr. Potts said he had been in doubt whether to call this encephalitis or only poisoning. He had decided in favor of encephalitis because there has evidently been some permanent damage, as symptoms are still there and there has been no improvement for some time. It seemed to him the symptoms could be explained by a lesion either in the neighborhood of the aqueduct of Sylvius or corpora quadrigemina. It must be remembered that there was also apparently some weakness at first of movements of the left eye and paralysis of associated movements upwards.

Dr. Harvey M. Ewing (by invitation) presented "A Case of Bilateral Syphilitic Facial Paralysis."

Dr. Spiller said he had recently had a case of bilateral facial paralysis from alcohol. The man had developed paralysis of the lower limbs and the paralysis had extended within a few days to the upper limbs and then

the facial nerves became paralyzed. The paralysis was flaccid and intense, and there was very little subjective disturbance of sensation and no objective disturbance. The condition was much like a Landry's paralysis. The man had been admitted three times to the drunk ward and the case was clearly one of multiple neuritis with double facial palsy. Some fabrication was observed.

[Later great improvement occurred in this case.]

Dr. John H. W. Rhein said that he had under his care at the Philadelphia Polyclinic Hospital a case very much like the one described by Dr. Spiller. The patient was a colored man who developed first paralysis of the legs and arms, paralysis of both sides of the face and finally paralysis of the tongue and of deglutition. There had been some pains in the arms and legs and there was slight tenderness over the nerve trunks. An electrical examination showed slight quantitative and qualitative changes. In this case there were no mental symptoms whatever and a diagnosis of multiple neuritis was made.

Dr. J. Hendrie Lloyd said that Dr. Ewing's case was very interesting indeed. Dr. Ewing had said that it seemed strange that a disease should pick out nerves so close together as the sixth, seventh and eighth, and yet some should escape and others be involved. This selective action, we know, is a peculiarity of syphilis. Dr. Lloyd said he had at present under his care at Blockley a man who had a bilateral sixth nerve palsy. Both sixth nerves are involved, but there is no involvement of the seventh or the eighth. He also has in the same ward a man who developed a third nerve palsy shortly after the primary sore of syphilis. Dr. Lloyd said he could not recall having seen bilateral facial syphilitic paralysis before, and he thought the case was in that respect a unique and interesting one. He should like to ask, however, whether Dr. Ewing could be sure that the patient had not been exposed to cold; whether, in other words, the case had not come on like an ordinary Ball's palsy. In Dr. Lloyd's experience syphilitic paralysis of the seventh nerve, even on one side, is a rare affection.

Dr. W. B. Cadwalader said that about two years ago he had shown a patient before this Society with bilateral facial palsy. He had syphilis about seven or nine years previous to the onset of his palsy. When Dr. Cadwalader saw him he had double Argyll-Robertson pupils and loss of tendon reflexes. He was not supposed to have been ill, but while he was exposed to cold shoveling snow his face became paralyzed, first on one side then on the other. He also had a positive Wassermann reaction. Under antisyphilitic treatment the patient regained some power in the facial muscles, but he has not yet entirely recovered.

Dr. Max M. Peet (by invitation) gave "A Preliminary Report on Extirpation of the Pineal Gland, with a Review of the Subject up to the Present Time."

Dr. Charles H. Frazier presented a paper on "The Physiology of the Cerebrospinal Fluid as a Problem in Intracranial Surgery."

Dr. S. D. Ingham said that the subject of the secretion of cerebrospinal fluid was a most interesting one. It recalled to him two cases, one of which he thought was rather unusual, that of a child with a tumor in the fourth ventricle, for which a decompression was done. A large hernia subsequently developed having a cystic appearance, and on tapping was found to contain cerebrospinal fluid. The hernia communicated with the ventricular system of the brain as the post mortem showed. The remark-

able rapidity of secretion of cerebrospinal fluid in this case may be estimated from the fact that from six to eight ounces of cerebrospinal fluid were removed every day or every second day for a period of several weeks. Another case in which a section of the skull was removed followed an injury, leaving a defect in the cranium two or three inches in diameter. When the patient was in the erect position there was a depression in the scalp which amounted to one or one and one half ounces of space. When lying down the space was filled out to normal contour. The variation in the condition of the scalp took fifteen or twenty minutes after a change of position. Dr. Ingham thought this was to be accounted for by the absorption of the cerebrospinal fluid in the erect position, this being influenced by the pressure and gravity. These points, he thought, bore upon the question of influences at work in modifying the quantity of the cerebrospinal fluid.

Dr. S. D. Ingham and Dr. George Wilson each presented a case of dystonia musculorum deformans.

Dr. Cadwalader said he had been very much interested in the case that Dr. Ingham had shown, as he understood there had been tenotomy done. Dr. Cadwalader inquired whether the rigidity or spasm of the muscle had ever been sufficient to cause a permanent contracture which could not be overcome by resistance. In the cases Dr. Cadwalader had seen permanent contracture with actual shortening of the muscles had not taken place.

Dr. Ingham replied that the foot was probably thrown out of the normal position early in the disease and the operations were done to straighten the foot. He was not personally familiar with the early history of the case.

Dr. Spiller said that the case that Dr. Ingham recorded he thought was under his care at the University Hospital before this condition was discussed by Oppenheim. It was a peculiar case in very many ways. When the child was in Dr. Spiller's service there was marked contracture. Dr. Spiller said he was much impressed by the atrophy of the lower limbs, notwithstanding the constant muscular movements.

Dr. G. E. Price said that about four years ago the case was for a time in the Jefferson Hospital. At that time the process had only extended as far as the legs, chiefly below the knees, and more marked on one side than on the other. The muscles were then in a state of tonus greater than normal and upon this hypertonicity would occur waves of still greater contraction. The boy was observed while he slept and under anesthesia, and there was no relaxation in either case. In the orthopedic department the experiment was tried of placing a cast on the limb most affected after restoring it to normal position. The cast proved so painful that it was promptly removed.

Dr. George Wilson said the boy was in the University Hospital in 1910. He had a marked contraction of the foot. He also had marked choreiform movements, involving the arms and body. One diagnosis given was hysteria, the other was involvement of the pyramidal tracts.

Dr. John H. W. Rhein presented "A Brain Showing Aneurysm of the Basilar Artery."

A CASE OF TAY-SACHS AMAUROTIC IDIOCY WITH A
POSITIVE WASSERMANN REACTION

By George E. Price, M.D.

B. S., age 16 months, of Russian-Hebrew parentage. The child did not take notice nor sit up at the usual age and has never walked nor talked. He presented mental impairment or deficiency, general muscular paresis, convulsions, increased reflexes, Babinski's sign and blindness.

The eye grounds, examined by Dr. L. Webster Fox, showed double optic atrophy and the characteristic red spot with a grayish or whitish areola in the region of each fovea centralis.

The blood serum, examined by Dr. Thomas B. Earley, was positive. Examination of the child's cerebrospinal fluid and the parents' blood was refused.

The patient was the only living child, the parents having had one other baby which died shortly after birth from "hemorrhage of the navel."

The family history developed no cases of blindness nor anything of interest beyond epilepsy of a paternal aunt and "convulsions" in a maternal uncle which disappeared at the age of 9 years.

Dr. Price discussed the pathology and etiology of amaurotic idiocy, reviewing the various theories advanced by Tay, Sachs, Frey, Turner, Holmes and others, and said that he did not feel that the evidence so far presented had definitely excluded the possibility of hereditary syphilis being the cause of Tay-Sachs disease.

Dr. Price in reporting his case before the society did not wish to attach undue importance to the laboratory findings in a single case, but to stimulate interest in the subject with the hope that, as opportunity presented, future laboratory examinations would throw more light on the question. He said that Dr. Earley had taken much trouble in the endeavor to obtain some spinal fluid from the patient and some blood from the mother, but that the family had refused to allow him to make these tests.

Translations

VAGOTONIA

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER AND DR. LEO HESS

OF VIENNA

TRANSLATED BY WALTER MAX KRAUS, A.M., M.D., AND
SMITH ELY JELLIFFE, M.D., PH.D.

(Continued from p. 472)

It is as difficult to explain cardio and esophagospasm as it is to say anything very definite about the physiology of the cardiac and esophageal musculature. Both conditions are typical diseases of vagotonics. Both may come on paroxysmally and are to be attributed to a periodic increase in tone. They are often relieved by atropin, though this is not always the case, a fact which seems to point rather to too small a dose of atropin having been given than to a belief that the condition is not due to vagal stimuli. Occasionally one is under the impression that atropin aggravates the condition, having an action contrary to its usual type, a phenomenon which we shall have cause to mention in other connections. We shall consider the possibility of explaining this anomalous action in the section on therapy.

A not infrequent complaint of vagotonics is that on swallowing food it seems to stick in the esophagus behind the heart. If one follows the progress down the esophagus of a mass of bismuth, great variations in the speed of passage may be seen. In not a few cases of typical vagotonics, one finds that the food passes slowly down the esophagus and even piles up, remaining stationary a short time. The assumption that the tone of the esophagus is decreased in many cases is rendered very probable

by these findings. Here we must state that vagotonics have an almost entirely anesthetic pharynx, a phenomenon that will be more fully discussed later. Since cocainization of the pharynx or the places sensitive to the swallowing impulse may disturb the act of swallowing and also the passage of material down the esophagus, we believe that a similar condition exists in vagotonics, i. e., anesthesia of the pharynx with resultant disturbed swallowing and passage of food. In other instances, the bismuth meal is retained for a relatively long time in the esophagus, but it is found that this, instead of being dilated, is much constricted. It is just in these cases in which one sees very active gastric peristalsis and even antiperistalsis. One may also distinguish in the esophagus as in the stomach the difference between tonus and increased peristalsis.

Vomiting as it occurs in hysteria, in the early stages of pregnancy combined with ptyalism and further when cerebral pressure is raised due to some organic cerebral disease, is probably due to stimulation of the gastric vagus. At any rate experimental stimulation of the central end of the vagus will evoke vomiting movements.

The Intestine.—In studying the nervous disturbances of the intestinal canal, we must first differentiate between the small and the large intestines. Functional tests of the jejunum and ileum are very difficult, since their motility may only be followed radiologically, and their secretory and absorption activity is to a great degree complicated by the compensatory action of the colon.

Autonomic stimuli cause an increase of peristaltic action in the small intestine. To determine the degree of this increase is difficult, the only certain criterion being the time required for a bismuth meal to pass from the stomach to the colon. In many vagotonics, this time is considerably shortened.

The mechanism of the musculature of the colon is very complicated. The activities, much like the pendulum activities of the small intestine, appear to be very sluggish, and, if the newer investigations of Holzkmacht¹⁴ be correct, are only periodic. It is far easier to determine the changes in diameter of the colon radiologically. If the colon contain a bismuth meal, many types are seen. In some cases, the ascending colon remains filled for a considerable time, which, due to the overtaking of its capacity,

¹⁴ Holzkmacht, G., Münch. med. Woch., 1909, No. 50.

increases its diameter; while the transverse and descending colon are empty for a considerably longer period than is normal. In other cases, on the contrary, the ascending colon empties itself rapidly, while the transverse and descending parts contain the bismuth for a correspondingly longer period. It seems characteristic of this latter type of case that, as far as may be determined by the X-Ray, the "haustren" appear to be very clearly defined. But in these cases also it may be seen that small parts of the bismuth which make up the fecal column are cut off and the entire lumen is narrowed. If the bismuth remains for a longer time in the descending colon, it may conform to the first described type and remain in this location the longest time. Finally there is another frequently observed type in which almost the entire colon is free of bismuth, and almost all of the bismuth is piled up in the sigmoid or ampulla.

Without having any *a priori* opinion, we can state that we have noted both diarrhea and constipation in our cases of vagotonia. To explain the diarrheas is not at all difficult from the point of view of vagotonia, since it is known that pilocarpin will cause this condition in animals. In these cases both increase of peristalsis and increased serous transudation in the intestinal lumen play a part. As a matter of fact, diarrheas are found in various conditions of increased irritability of the vagus, as in Addison's disease and the vagotonic types of Graves' disease. They may be produced by pilocarpin, relieved by atropin, if the individual be at all predisposed to them, and it may be added that adrenalin clysmata sometimes relieves them. The diarrheas seen in vagotonics appear to be referable to the same cause as the spastic constipations.

Individuals who suffer from spastic constipation have the same type of contracted transverse and descending colon as that just described. A characteristic of this form of constipation is the inconsistency between the amount of the ingested food and the amount of the stool. This latter is usually hard, dry, marble-shaped and scanty. This is due to the fact that there is increased absorption of the chyme. In many cases, the small masses of stool are covered with mucus and seem wrapped in fat. This suggests an increased secretory activity on the part of the lower bowel, particularly since this condition so nearly approaches that of mucous colitis or a membranous enteritis. This latter is

surely to be regarded as a secretory neurosis of the intestine since atropin has such a markedly beneficial action upon it.

The condition known as eosinophilic catarrh of the intestines is probably related to this disease and perhaps this is similar to bronchial asthma with its sputum rich in eosinophiles.

If we wish to attempt an explanation of spastic constipation in terms of autonomic stimulation, we must not forget that an important factor in this disease is an increased absorption of chyme, or a decreased production of mucus by the intestines. It need only be recalled here that the intestine will push forwards a large marble introduced into its lumen better than a small one, of which it can scarcely get rid. The probability that spastic states play a part is increased by the fact that atropin can rarely be dispensed with in these cases. Most probably the autonomic stimuli influence the activity of the intestine through an action upon the circular musculature, much in the same way as they do in increased stomach tone. Just to what degree autonomic stimuli play a part in increasing absorption of chyme [better absorption or digestion] remains to be investigated. (It is possible that these autonomic stimuli cause an increased production of ferments.

Spastic constipation is often combined with spasm of the sphincter recti. This latter is often the principal complaint of the patient, and may in itself disturb the emptying of the bowel, owing to fear of the pain produced by defecation. We have noticed this symptom where there was neither fissure nor rhagades. These cramps in the rectum may be increased by certain diseases such as tabes, or may be the most important symptom of the disease, or may attract attention as a solitary symptom—coming in the form of crises.

Disturbances of the rectum are not infrequently associated with disturbances in other parts controlled by the pelvic nerve. Those patients who complain not only of spastic constipation but of anal cramps during defecation, are frequently disturbed by erection and prostaticorrhea occurring during defecation, and probably many functional dysurias, such as pollakiuria, tenesmus, and dribbling are due to the same mechanism. And here must be included cases of "Trabekelblase" [predominance of the action of the detrusor muscle supplied by the autonomic system] which occurs as an early symptom of tabes. The fact that atropin has no effect in any of these disturbances except sphincter spasm cor-

responds with experimental observations that the pelvic nerve, which atropin should influence, is the great exception to the rule. On the other hand, pilocarpin irritates that nerve. We have observed spermatorrhea—though infrequently—as a consequence of an injection of pilocarpin, particularly in psychopathic individuals.

It is very difficult to say whether the spasms occurring in the gall bladder and ducts are always of lithogenous origin, and not frequently of nervous origin. We have seen a case which came in with all the signs of a cholecystitis and which on operation showed a gall bladder free from stones and inflammation. That spastic conditions of the gall duct play a rôle in the etiology of jaundice is shown by many observations of cases having cholecystitis. We have seen cases in which operation has shown that it was impossible for a stone to leave the bladder, and yet these cases showed jaundice at the height of the attack. The stool had been acholic up to this time. It is quite possible, that just as the spasm of the gall-bladder may evoke changes in both stomach and intestines, even causing pylorospasm, so it may produce spasm in the bile ducts, particularly the common duct, causing a transient occlusion of the lumen. The bradycardia so often accompanying gall-stone colic as well as the condition of the stomach and intestines shows clearly that the vagal system is being irritated. Such spasm may thus become the etiology in the nervous spasmodic jaundice described by Chvostek. Atropin has an excellent sedative effect upon the spastic conditions in these cases. But here it is quite worth noting that the usual doses of atropin are often insufficient to dissipate the colic [very hyperactive vagus].

It is quite possible that similar conditions may exist in the smooth musculature of the kidneys and urinary passages. We refer particularly to reflex anuria, which may possibly be associated with spasm of the renal vessels. Hans Meyer¹⁵ raises the question of spasm of the renal canals in this connection. Experimental observations to determine the influence of the autonomic system upon the renal secretion are lacking. But this fact seems significant to us. Adrenalin, though it constricts the renal vessels, will cause polyuria [Jonescu]. We know that the same occurs in man. But, polyuria in man is by no means a constant

¹⁵ Meyer, Hans, und R. Gottlieb, *Die experimentelle Pharmakologie*, 1910, p. 292 et seq.

result of giving adrenalin, and most probably is produced only in sympathicotonic individuals.¹⁶ Some have tried to include othotic albuminuria as a manifestation of a vagotonic constitution [H. Pollitzer]. We have no individual experience relative to the correctness of this opinion. As symptoms of vagotonia on the metabolic side may be mentioned the lack of glycosuria after adrenalin as well as a high tolerance for dextrose—250 to 300 grams being assimilated without any resultant glycosuria.

Finally, there is a change in the blood picture which may develop on the basis of vagotonia. This is eosinophilia. It has already been shown that pilocarpin will evoke this while atropin will dissipate it.¹⁷ It is a frequent accompaniment to vagotonic stimulation and occurs very frequently in disturbance of the skin, intestines and lungs. Increase up to 5 per cent. occurs in other vagotonics as well. In individuals with sympathicotonia this eosinophilia is entirely lacking.

When we discuss, in the pages to follow, such diseases as spastic constipation, bronchial asthma, etc., it will be shown:

1. That the majority of the symptoms of these diseases are to be referred to autonomic stimulation.

2. That, besides those changes in the tone of the autonomic system directly responsible for the disease, there are also symptoms in other parts of the same system which are not manifestations of spasm but of increased vagus tone, as for example, bradycardia, hyperidrosis, etc., which leads to the opinion.

3. Those having a constitution which shows signs of general or local increase of autonomic tone are not infrequently found, and form a class which is predisposed to the most varied kinds of diseases.

Such manifestations of increased vagal tone may show in the entire system or its ramifications, or in a single branch.

(To be continued)

¹⁶ *Translators' Note.*—See Falta, W., Newburgh, L. H., and Nobel, E., Ueber die Wechselwirkung der Drüsen mit innere sekretion, Über Beziehungen der Ueberfunction zur Konstitution, Z. k. M. V., 72, p. 2101.

¹⁷ *Translators' Note.*—See W. W. Herrick's article, Arch. Int. Med., V, 13, 1914, p. 794.

Periscope

Archiv für Psychiatrie und Nervenkrankheiten

(51. Band, 2. Heft)

- XI. Diffuse Carcinomatosis of the Pia Arachnoid. SIEGFRIED MAASS.
- XII. Deaths from 1888 to 1904 in the Institution for Mental Disease in Hall in the Tyrol and their Causes. FRIEDRICH PLASELLER.
- XIII. Sexual Abnormalities and their Legal Significance. ERNST ZIEMKE.
- XIV. Hemangioma of the Pia in Vascular Nevus of the Face. OTTO HEBOLD.
- XV. Tabes and the Treatment of Post-syphilitic Diseases of the Nervous System with Mercury and Salvarsan. S. TSCHIRJEV.
- XVI. Clinical and Diagnostic Peculiarities of Idiopathic and Sympathetic Facial Neuralgia. MICHAEL LAPINSKY.
- XVII. Neocerebellar Hemiatrophy. B. BROUWER.
- XVIII. Concerning Certain Relationships Between the Brain, Seminal Glands, and the Organism as a Whole. GEORG LOMER.
- XIX. Pathologic-Anatomic Investigations of the Finer Structure of the Cerebral Cortex, the Cerebellar Cortex, the Oblongata, and the Cord of Man in Asiatic Cholera. SERGIUS MICHAILOW.
- XX. Acromegaly. HEINICKE.
- XXI. The Relation of Injuries to the Brain Cortex to an Increase of Predisposition to Convulsions. MAX KASTAN.

XI. *Diffuse Carcinomatosis*.—Maas finds in the literature eighteen cases of diffuse carcinoma metastases in the pia which he summarizes, and adds a detailed study with illustrations and microscopic findings of a personal case. The patient suffered from an acute psychosis, beginning eleven to twelve weeks after an operation for inoperable colon carcinoma. In general, the psychosis was of the character of the Korsakow symptom-complex. The relation of the psychosis to the general findings is discussed at length. The author is inclined to deny its toxic etiology; nor was there evidence of increased intracranial pressure; nor did it seem likely that the original operation stood in causative relation to the subsequent condition found in the brain. A discussion follows of the probable method of metastasis, and the conclusion is reached that carcinoma of the intestinal tract is peculiarly liable to produce metastases in the membranes of the brain. The reason for this is not evident, but in general it appears that the course of the metastasis is either through the lymph or blood channels. The paper presents an interesting and carefully elaborated case history with somewhat indefinite conclusions.

XII. *Mortality in Hall*.—In this statistical paper, Plaseller has studied the causes of death in 444 cases, and discusses in great detail the time of the year, the sex incidence, and the immediate causes of death. All these facts are tabulated in such a way as to be impossible of detailed description. In general, it was found that 4 died of cerebral hemorrhage, 124 of

pneumonia or its complications, 1 of endocarditis, 2 of diseases of the digestive organs, 4 of nephritis, 15 of malignant tumors, 99 of infectious diseases, chiefly tuberculosis; 7 from suffocation, 8 from suicide, and 2 without discoverable cause.

XIII. *Sexual Abnormalities*.—Ziemke in this paper re-opens the question of the cause of various sexual perversions, and points out the difference of opinion which has prevailed regarding their etiology. The opinions of Caspar, Krafft-Ebing, Blochs, Forel, Möbius, Hirschfeld, Freud, and others, are detailed. Several cases are somewhat briefly reported illustrative of certain forms of perversity, particularly of the homosexual variety. The difficulty of a proper legal interpretation of these cases is discussed, and it is pointed out that the main duty of the law and of an expert opinion is to state the case in as objective a manner as possible. The danger of allowing one's feelings to interfere with such an objective point of view is emphasized. The article constitutes a valuable statement on an important medical, social, and legal question.

XIV. *Hemangioma*.—Hebold reports several cases of hemangioma of the pia occurring in conjunction with a vascular nevus of the face, with the general conclusion that within the skull a similar process occurs to that in the face.

XV. *Tabes*.—In this article Tschirjew, on the basis of a wide experience, particularly in a military hospital, discusses the important question of the treatment of late syphilis by means of mercury and salvarsan. He is definitely of the opinion that intramuscular and still more, intravenous mercury injections, are positively harmful, since they affect the smaller blood vessels in such a way as to predispose them to earlier hemorrhage. He places salvarsan in the same category, and maintains that, on account of its deleterious effect on the blood vessels of the central nervous system, it is entirely contra-indicated as a therapeutic measure against syphilis. He even goes so far as to assert that in military hospitals it may be desirable to give up entirely the treatment of the disease by means of numerous mercury and salvarsan injections. If it is desirable to use intramuscular mercury in cases where life is positively threatened, it should be employed only to a limited extent. In military practice, the conclusion is reached that antisyphilitic treatment should consist only in mercurial inunctions, or in the form of pills, together with daily baths and later iodide of potash. In general, therefore, Tschirjew is of the opinion that the only safe and effective means of treatment is by the use of mercury, particularly in the form of inunction.

XVI. *Facial Neuralgia*.—The types of pain occurring in the distribution of the fifth nerve must, according to Lapinsky, be divided into two categories, namely, into idiopathic neuralgia and sympathetic neuralgia. The idiopathic type is an exceedingly unusual affection, whereas the sympathetic variety is frequently met with. Idiopathic neuralgia runs a relatively favorable course and is amenable to local therapeutic measures; whereas the sympathetic variety is very stubborn and demands more than a local treatment. It is essential in the treatment of facial neuralgia to determine as far as may be the etiology of the affection. To accomplish this, one must have constantly in mind a large number of diseases which may by reflex means lead to the ultimate symptoms of facial pain. In this connection, primary affections of the cavities of the skull, of the sinuses, nasal and intracranial, tumors located in the neighborhood of the fifth nerve, aneurisms, various lesions of the brain stem, and diseases of

the abdominal and sexual organs, must be carefully considered. Of special importance is the condition of the teeth and of the cavities of the nose, forehead and antra. Finally, it is necessary to consider the possibility of an actual neuritis of the nerve or a compression of its roots. The article constitutes a résumé of, rather than an addition to, our existing knowledge.

XVI. *Neocerebellar Hemiatrophy*.—This article is so technical in character, and involves so detailed an anatomical study, that it does not permit of adequate review.

XVIII. *Relationship of Glands of Internal Secretion, Brain, and General Organism*.—Lomer takes up in this article a study of the important relationships between certain glands of internal secretion and the brain, and the general development of the organism. In following out this study, fifty cases dying with mental disease were studied with relation to the weight relations of the seminal glands, the brain, and the body as a whole, which gave interesting results which are of importance in a general study of the subject. For the details of these studies, the reader must be referred to the statistical tables in the original text. Particularly interesting is the difference between men and women with relation to the potency of testicles and ovaries respectively, with a great preponderance in favor of the male. This fact is brought into relation with certain matters of sexual physiology in the two sexes. Certain interesting deductions are also drawn as to the relative mental capacities of men and women. The suggestion is made that studies of a similar sort should be undertaken on persons mentally sound to determine whether similar results would be found. In general, this paper opens a somewhat original research which might well be carried further, and which may lead to certain results of biological and physiological importance.

XIX. *Changes Induced by Cholera in Central Nervous System*.—Michailow describes in detail the changes which take place in the central nervous system in persons dying of cholera, particularly with relation to the nerve cells and the blood vessels. The conclusions are summarized under thirty-four headings, which for lack of space cannot be here detailed. It is conclusively shown that the entire nervous system suffers in this disease, and that changes which may be regarded as specific occur in the nerve cells throughout the central nervous system.

XX. *Acromegaly*.—On the basis of a single case report, Heinicke is uncertain whether the acromegalic symptoms were induced through a tumor of the hypophysis or through hydrocephalic pressure, but leans toward the latter explanation.

XXI. *Relation of Injuries to Brain to Increase of Convulsions*.—Kastan offers many theoretical considerations regarding the conditions of the cortex in relation to its predisposition to the production of spasmodic affections. The article offers little beyond hypotheses.

E. W. TAYLOR (Boston).

Deutsche Zeitschrift für Nervenheilkunde

(50 Band, 1-4 Heft)

The Seventh Annual Meeting of the Society of German Neurologists was held in Breslau from September 29 to October 1, 1913. Besides addresses and demonstrations, there were 38 scientific papers. It is obvious that space is not available for abstracts of all these.

1. Late Infantile Familial Amaurotic Idiocy with Cerebellar Symptoms. BIELSCHOWSKY. 2. A Particular Histological Report in the Domain of Early Infantile Familial Disease of the Nervous System. LÜTTGE. 3. The Anatomical Condition Determining Hereditary Nervous Disease. SCHAFER. 4. Pseudosclerosis. STRÜMPPELL. 5. Pathological Anatomy of Paralysis Agitans. LEWY. 6. Consideration of the Newest Conception and Nature of Metalues. ERB. 7. A Case of Congenital or at Least Very Early Acquired Amaurosis Due to Encephalitis of Both Occipital Lobes with Post-mortem Findings in a 13 months' old Child. UTHOFF. 8. Experimental Syphilis of the Central Nervous System. WEYGANDT. 9. The Worth of Some Modifications of the Wassermann Reaction, the Cholesterin Extract Method and the Cold-binding Method of Jacobthal. SAENGER. 10. Contribution to Serology in Diseases of the Nervous System. KAFKA. 11. Meningocerebellar Symptom-Complex in Fever Diseases. FOERSTER. 12. Physiological Anatomy and Localizing Diagnostic. Value of Hemiataxia. AUERBACH. 13. Clinical Recognition of Tuberculous Sclerosis of the Brain. SCHUSTER. 14. Investigation of the Vestibular Apparatus in Acute Alcoholic Intoxication and in Delirium Tremens. BÁRÁNY and ROTHFELD. 15. The Dependency of Bárány's Index Reaction of the Position of the Head. REINHOLD. 16. Management of the Aphasias. FRÖSCHELS. 17. Organic Neuroses Röntgen Pictures. KREUZFUCHS. 18. The Pathogenesis of Stammering. TRÖMMER. 19. Traumatic Spondylitis. FOERSTER and SILVERBERG. 20. The Management of Severe Occipital Neuralgia. NONNE and OEHLECKER. 21. The Diagnostic Worth of Brain Puncture. STERTZ. 22. Excitometric Procedure of Zanietowski and the Abridged Method of Electric Diagnosis. ZANIEWSKI. 23. Endothelioma of the Brain. KRON. 24. Retrobulbar Neuritis with Nervous and General Disease. LANGENBECK. 25. Pathology of the Paralysis of Vision. FREUND. 26. Pain, Particularly in the Neuroses. OPPENHEIM. 27. Neuropsychological Fundamental Law. RANSCHBURG. 28. Management of Sexual Impotence. LISSMANN. 29. New Apparatus for the Management of Writers' Cramp. MEYER. 30. Basedow's Disease in Men. MENDEL and TOBIAS. 31. The Relation of Narcoleptic Attacks to Tetany. MANN. 32. The Function of the Nerve Endings in the Vessel Walls. MEYER. 33. The Results of the Abderhalden Serum Diagnosis in Brain and Spinal Cord Disease. GOLLA. 34. The Psychoneuroses in Heart Disease. LILIENSTEIN. 35. Anatomical Findings in a Case of Wilson's Disease. STECKER. 36. Combination of Hysterical and Organic Suffering. LEIDEN. 37. Hemianopsia. LENZ. 38. "Mikropan"—A Universal Hand Connecting Apparatus for Electromedical Purposes. RANSCHBURG.

1. *Amaurotic Idiocy with Cerebellar Symptoms*.—The author reports cases belonging to the juvenile group studied by Spielmeyer and Vogt in 1905. The histopathology is shown in 16 beautiful illustrations, which, to be appreciated, must be seen. Marked atrophy of the cerebellum was found and a similarity observed between the form described by Lejohne and Lhermitte as olivo-rubro-cerebellar atrophy and the olivo-ponto-cerebellar type of Dejerine and Thomas. The author's study shows that the sphere of familial amaurotic idiocy is larger than the stereotype form of Tay-Sachs disease.

5. *Paralysis Agitans*.—Lewy's studies have been made over a period of 30 years and based upon the observation of 60 cases. He states that in an atypical case there may be seen macroscopically a well marked groove

between the thalamus and caudate nucleus. In the frontal section through the mid-brain it is seen that the lenticular nucleus is drawn together and scarcely half its normal size. The medullary sheaths are wanting in the putamen and globus pallidus, the ganglion cells have mostly fallen out and sclerotic tissue is seen. The whole structure is filled in with glia cells and fibers. The degeneration is systemic and begins in the internal capsule. The process is a slow, simple degeneration of the tissue in which the architecture proper is not disturbed.

6. *Metalues*.—The writer for the most part propounds certain questions which he proceeds to discuss. (1) Is the so-called metasyphilis a genuine syphilis? This we can hardly doubt. The knowledge obtained through chemical reactions, the Wassermann test, the cytological examination and the histopathological studies, all point toward this conclusion. (2) The important problem now for investigation is the biology of the pallida. Has it different species and inferior varieties? One thinks of the types of human and bovine tuberculosis. (3) The question of a special syphilis of the nervous system (*Syphilis à virus nerveux*) appears to be answered by the recent work of Oscar Fischer in the affirmative. (4) Another much disputed question arises in the histopathology of metalues—Is the primary implication glio-vascular or is it degenerative?

13. *Tuberous Sclerosis*.—For our first anatomical knowledge of this condition we are indebted to Bournville and the appearance presented by the unhardened tissue is that of markedly indurated areas of sclerosis which are slightly elevated beyond the surrounding brain substance and with these there is sometimes found small tumors protruding into the ventricles. Tuberous sclerosis in connection with glial formation may present the common picture of brain tumor.

Recently, Schuster has made the clinical diagnosis in some of the feeble-minded and epileptic. Eight cases are reported, one of which came to autopsy. The identity of the disease in these cases he bases upon the finding of adenoma sebaceum on the face together with small angiomas, the latter appearing chiefly at the sides of the nose and on the chin; other cutaneous anomalies may be present. At times the internal organs, especially the heart and kidneys, are invaded by small growths which may give rise to some of the symptoms found in the chronic disorders of these organs. The skin manifestations may to a less extent be found in some of the blood relatives. One man was seen who showed typical adenoma sebaceum without any other appearance of disease but he had a daughter of 6 years who was an epileptic idiot. Schuster states that tuberous sclerosis must be interpreted as a conditionally endogenous, hereditary family disease. He furthermore refers to a relationship with Recklinghausen's disease and says while tuberous sclerosis involves chiefly the brain and skin, in neurofibromatosis it is for the most part the peripheral nerves that are implicated.

35. *Wilson's Disease*.—Strecker found bilateral softening of the lenticular nuclei macroscopically; microscopically, there was an increase in glia cells, some unusually large, nuclei pale, often lobulated and without cell body; other cells were large and with one or more nuclei which he considered as giant glia cells. These changes were strongly marked in the lenticular and caudate nuclei, pons, cortex and other parts of the central nervous system but practically without changes in the cerebellum and cord. In the areas of softening the ganglion cells showed swollen bodies, the Nissl flakes were lost, the nuclei were shrunken and pushed to the

edge. No vessel change except slight thickening of the adventitia. No round cell infiltration. In the cord was a slight glia cell increase at the site of the tracts. The liver showed a singular nodular appearance and the histological picture of cirrhosis.

Mann demonstrated a case of chronic progressive torsion spasm (mild form). It was that of a 24-year-old merchant in whom for two years there had been tonic and also slight clonic contractions, chiefly in the abdominal muscles but also in the right extremities; they were torsion-like in character. The case was chronic but had come to a standstill. All previously described cases had been in Russian Jews and this was the first case known to be of Germanic origin.

YAWGER (Philadelphia).

MISCELLANY.

ABDERHALDEN TEST IN MENTAL DISEASE. Charles E. Simon (Journal A. M. A., May 30, 1914).

The author takes up the claims of Fauser as to the findings of the Abderhalden test in certain types of insanity with special reference to dementia præcox. He reviews the literature which followed Fauser's publication and says that in surveying it one cannot help but being impressed, on the one hand by the wonderful uniformity of the results reported by Fauser and the wide divergence from those of certain other authors, like Hauptmann and Bumke. He thinks that there is good ground to suspect that Fauser was too enthusiastic in his views and also that his opponents may have lacked complete control of the technic. Fauser himself states that he obtained a reaction with sex gland repeatedly in cases in which it was unexpected and that the diagnosis between manic-depressive insanity and dementia præcox could not always be made with certainty. Simon relates his own experience with the use of the test in 106 cases and says "to summarize the results" that a sex gland reaction may be obtained in nearly if not all cases of dementia præcox at some stage or another but that this action is not specific as Fauser asserts. He finds that the reaction may also be obtained in other forms of insanity and he does not attempt to explain them. He must therefore conclude that Fauser's rule has exceptions or that the positive findings in manic-depressive insanity or paresis are due to errors of diagnosis or technic. The fact, however, remains that in dementia præcox the positive reaction is the rule, while in the purely functional psychoses it is the exception. Simon, therefore, discusses at length the technic employed and which he thinks meets fairly any criticism from the technical point of view as far as our knowledge goes at present. He believes, however, that advances can still be made and while we cannot, as yet, draw positive conclusions regarding the significance of the reaction in dementia præcox, certain possibilities suggest themselves. One of these is that of a perverted function of the cells concerned in the production of the internal secretion of the sex glands in dementia. "Considering the problem from the clinical side, the all-important question of course suggests itself whether or not the reaction has any relation to the pathogenesis of dementia præcox. Theoretically, this is of course perfectly possible. Granted that anti-sex gland ferments do occur in the circulation in dementia præcox, and that their presence were the outcome of the appearance in the circulation of an abnormal secretion or of abnormal cells, then we may also

assume that digestion of these cells or cell-products will take place, and that all conditions would thus be given for a chronic protein intoxication which might very well expend itself on the central nervous system. Should this be true, then we might also expect that the administration of sex gland to such patients would cause on aggravation of the patient's condition, while partial or entire castration, possibly combined with the transplantation of normal organs, might similarly be expected to have a beneficial influence. Evidently, the problem is now open to investigation from many sides, and it does not seem unreasonable to expect that definite advances will be achieved in the near future."

AUTOSEROSALVARSAN TREATMENT. G. W. McCaskey (Journal A. M. A., January 17, 1914).

The author reports on eleven additional cases treated by the autoserosalvarsan method and now discusses certain points in the light of this new experience in the Journal A. M. A., May 30, 1914. The first is the problem of asepsis, which was called to his attention by an accidental infection of the spinal canal in an early one of these eleven cases. The chances of contamination in the preparation of a serum for intraspinal injection by the open air method are manifest. The skin of the patient at the point of puncture and of the hands of the operator and assistant cannot be absolutely sterilized and the possibilities of air contamination, even in a refrigerator, are evident. The paucity of antibodies in the fluid is also to be considered. McCaskey describes an apparatus, which is best understood with the illustration as is also the technic which is given, the repeated use of which has failed to show any defect from the point of view of asepsis. The entire outfit costs about \$5. With the use of gloves the only possibility of serum contamination would be in puncturing the skin and if germs can be picked up by a needle in passing through iodinated skin, assuming this to be the best method, perfect aseptic technic is impossible. As regards the time of withdrawal of blood, he varies a little from the Swift and Ellis technic, according to which the blood is withdrawn one hour after intravenous injection of neosalvarsan. If this is entirely evenly distributed in the blood the amount in each 12 c.c. of serum must be very minute and constantly decreasing. In the course of an hour it may not be detectable. McCaskey has therefore gradually and cautiously shortened the time between the intravenous injection and the withdrawal of blood for the serum to about twenty minutes. In order to secure a more rapid and uniform diffusion through the circulating blood the neosalvarsan is injected very slowly for seven minutes, the approximate time to complete the circulation in the body, the serum will then contain a larger amount of the neosalvarsan and thus, he believes, be more therapeutically efficient. To increase the intraspinal dosage he has begun very cautiously to use a lowered dilution till in a few cases he used undiluted serum. This, however, rapidly settles and might delay the effects. In from 60 to 80 per cent. dilution, diffusion readily occurs and he does not advise the dilution being lowered further. One of the most interesting sidelights on the treatment, McCaskey says, is afforded by a contribution by Flexner and Amoss. Their experiments were made with poliomyelitic cerebrospinal fluid. They watched the gradual passage of the virus through the choroid plexus which seemed to be complete in ninety-six hours and then persisted as late as the nineteenth day. McCaskey says that he has

observed what he thought was an analogous condition in untreated syphilis where the Wassermann failed in the blood but was still positive in the spinal fluid. Ravaut's method of directly injecting a 6 per cent. solution of neosalvarsan does not seem to McCaskey to offer the same advantages as the Swift and Ellis method. Besides the dangers which these authors have pointed out, the serum method may be assumed to supply important antibodies, which may play a large rôle in the therapeutic results.

CEREBROSPINAL FLUID. C. H. Frazier. (J. A. M. A., July 25, 1914.)

The author takes up the subject of the cerebrospinal fluid as a factor in the problem of intercranial surgery. He points out that it is a very important factor in all cases. Taking first meningitis as an illustration, he shows that there is an increase in the cerebrospinal fluid causing pressure interfering with the blood-supply and the function of the vasomotor and respiratory cardiac centers, and this is a determining factor as often perhaps as the specific infection. The treatment of meningitis should, therefore, include some means of controlling the intracranial pressure, as well as the microbic activity. The study of the physiology of the cerebrospinal fluid in relation to the congenital hydrocephalus offers another fruitful field for study. We do not know at present the causes of this condition, and the surgical treatment of it is also so far practically unknown. In brain tumors the cerebrospinal fluid is an absorbing topic. In most cases the increased intracranial tension is the result of the excessive accumulation of the cerebrospinal fluid, and the palliative treatment then becomes a problem dealing with this excessive accumulation. It is only since 1840 that the connection between the subarachnoid spaces and the ventricles has been known. The cerebrospinal fluid has no analogy in the body. It is different on the one hand from lymph, and on the other from the liquid found in serous cavities, and some believe that it has some connection with nutrition of the brain cells. Some believe that it is simply a means of preserving the balance of intracranial pressure, and others again think that it is a mechanism for eliminating carbon dioxid from the central nervous system, and like urea increases the renal flow, so carbon dioxid increases the cerebrospinal secretion. In health the amount of fluid varies from 60 to 100 c.c., and it is very rapidly increased under abnormal conditions, and there is reason for suspecting that it then may be of the nature of a transudation. It fills all the spaces in the cranial cavity not occupied by the nervous and vascular tissues. So far as we know, there are no pathologic conditions where the symptoms are due to its decrease, and by the use of dyes in the subarachnoid spaces we are able to demonstrate that the lymphatic system has very little to do with its absorption, but that this largely occurs through the venous channels. Frazier believes that the paccchionion bodies may have a small part in the absorptive process, and he attributes a good deal in this way to the cerebral sinuses. It is no longer a matter of speculation that the cerebrospinal fluid is the output of the cubical cells of the choroid plexus, and he asks, Should we not consider the choroid plexus a gland subject to various influences like other glandular structures, some well known, others yet to be discovered? The suggestion of Stiles that ligation of the common carotid is an effective way of dealing with hydrocephalus implies that the activity of the choroid gland is diminished by limiting its blood-supply as

hyperthyroidism is controlled by ligation of its arteries. Unfortunately, this analogy is not supported by clinical or experimental evidence. Frazier relates his experiments in controlling the secretion of the choroid gland with the extracts of other glands, the spleen, kidney, thymus, adrenals, etc. Nearly all of these produced a greater or less fall in blood-pressure, and with this an increased flow in the cerebrospinal fluid. He explains this by the fall of arterial pressure causing increased pressure in the cerebral sinuses, the dilatation of which forces the cerebrospinal fluid out of the ventricles. He notices Dixon and Halliburton's findings that indicate a specific action of some substance on the secretory function of the choroid gland. In his own experiments, to find some method of retarding this secretion, it was not until he had utilized the thyroid extract that he produced any thing like inhibition. "When injected in sufficient quantities, the thyroid extract caused a temporary fall in blood-pressure, with the usual transitory increase in outflow of cerebrospinal fluid; but the significant and altogether unique effect was the prolonged period of decreased outflow which followed, for three or four hours, that is, to the end of the experiment. Even when such small doses as to cause little, if any, change in blood-pressure are injected, the diminution in the rate of choroid secretion is marked, so that we are led to the conclusion that the thyroid gland extract, when injected intravenously, has a specific inhibitory action on the choroid gland." He will continue these studies. In conclusion, he says, the cerebrospinal fluid is of absorbing interest to the clinician in the diagnosis of many intercranial diseases and in measures for their relief. Of equal interest, however, are the problems of research to reveal the secrets of its function.

INTELLIGENCE TESTS. D. D. V. Stuart. (J. A. M. A., July 25, 1914.)

The author calls attention to the defects in the intelligence tests employed, especially the Binet-Simon test now in such general use. As part of a general examination and as giving approximately the extent of mental development, it is of undoubted value, but it cannot be considered as in any way comparable in accuracy to a chemical test, as seems often to be supposed. There are many things that may affect its value. The possibility of fatigue on the part of the subject and to a lesser degree of the examiner is one of these. The patient's training and home environment is another thing that may affect its value and most important of all, in Stuart's opinion, is the personal equation as regards the subject and examiner. A timid and sulky patient and a brusque and harsh examiner make a bad combination and on the other hand a too lenient one often unwittingly suggests the correct answers. Finally the patient's condition as to health may affect his standing in the intelligence tests. All these points are too often ignored and to support his contention he gives a table showing wide differences in the results of examinations by students in Johns Hopkins University. He says, "If intelligence-tests, when conducted by examiners with a knowledge of psychology and psychiatry, show such great divergence in their results, the assumption seems justified that the variation would be even more marked in inexperienced hands. It would also seem that it is time to stop regarding such tests as an infallible method of determining a patient's degree of mentality, independently of other considerations."

HYPOPHYSECTOMY AND GENITAL ATROPHY. AN EXPERIMENTAL CONTRIBUTION TO THE STUDY OF THE ADIPOSE-GENITAL SYNDROME. J. Camus and G. Roussy. (Soc. de Neurol. de Paris, December 4, 1913; *Revue Neurol.*, 1913, December 30, p. 770.)

The authors showed five dogs, young and old, on which they had performed hypophysectomy, more or less complete, by the palatine route; only two showed any trophic genital changes. In one of these the cauterization of the pituitary region by a red-hot needle had caused neighboring lesions, as was shown by the presence of disturbances of coördination and equilibration; in the other dog the authors purposely produced a basal cerebral lesion, which was rapidly followed by a large polyuria and testicular atrophy. They conclude tentatively that it is the basal lesion, rather than the pituitary lesion, which causes genital atrophy. Adiposity is not indissolubly connected with the genital atrophy, for they may be dissociated, as in the case of their second dog, which showed, after a total or almost total hypophysectomy, an enormous adiposity combined with perfect integrity of his testes and sexual functions. They suggest that the adiposo-genital syndrome may be due to lesions of separate centers which, though often affected simultaneously by the same processes, can be dissociated. As to the exact sites of these centers we must wait for a detailed histological examination.

LEONARD J. KIDD (London, England).

Book Reviews

LES TECHNIQUES ANATOMO-PATHOLOGIQUES DER SYSTEME NERVEUX. By A. Roussy and J. Lhermitte. Masson et Cie. Paris.

A most convenient little book for laboratory workers in this line.

It is well arranged, brief and concise. The introductory chapter contains valuable instructions in methods of removal of the brain and cord at autopsy, the proper method of gross sectioning, taking pieces for microscopical study, the proper cuts to make when various lesions exist and directions for formalin fixation in situ. These are points which are totally neglected or very superficially dealt with in most text-books dealing with the subject. The method given for fixation in situ consists in injection of formalin into the subarachnoidal space—a process which is more tedious and probably less satisfactory in results than that practiced by Meyer and Dunlap, of injection through the vascular system. The methods of fixing and staining the various histological elements are practically the same as used in all countries. A rather novel subject in a work of this sort but one, the relevance of which is obvious, is that of the study of the striated muscles in specimens taken during life and from the cadaver. The staining of intramuscular nerves is also dealt with. Several pages are devoted to methods of staining pathogenic organisms, including the treponema of syphilis in the nervous tissue. The book contains 247 pages devoted entirely to technique without digression into pathological appearances and with only a few illustrations limited to apparatus.

MOORE.

TECHNIK DER MIKROSKOPISCHEN UNTERSUCHUNG DES NERVENSYSTEMS, ZWEITE AUFLAGE. By W. Spielmeyer. Julius Springer, Berlin. M. 4.40.

The author of this little book needs no introduction to neuropathologists. The book itself supplies a long-felt want for a small, concise manual in which the laboratory worker may find at a glance all the commonly used methods of fixation and staining nervous tissues uncomplicated by descriptions of pathological appearances. The first edition, which appeared in 1911, covered the ground quite thoroughly, giving not only old standard methods but more recent ones, including the author's own valuable technique for myelin-sheath staining in frozen sections. The new edition makes few changes but contains some amplification, especially of difficult methods, and a chapter on staining various microorganisms in nervous tissues is added. The volume is 8vo, 142 pages, and is neatly bound in gray cloth with title printed in white. The author's preface announces that he has, in spite of many requests, refrained from descriptions and illustrations of pathological conditions and from references to the literature, preferring the work to remain simply a practical "technique." A text book on the pathological anatomy of the nervous system from the same author's pen will appear this year.

MOORE.

ORGANIC AND FUNCTIONAL NERVOUS DISEASES. A Text-Book on Neurology. By M. Allen Starr, M.D., Ph.D., LL.D., S.C.B. 4th edition, thoroughly revised. Lea & Febiger, New York, and Philadelphia.

We have had occasion to review the earlier editions of Dr. Starr's well-known text-book. As the best representative of the work of the American School it stands out by its clarity of statement and its richness of illustration. There is no doubt as to what the author means, for he has a trenchant and positive style which, with the copious illustrations, gives the book a pedagogic value that has been much appreciated, as evidenced by the fact of the comparatively rapid appearance of one edition after another. Special attention has been devoted in this new edition to the vasomotor disorders, and a much more extended consideration of functional disturbances has been given. "Good wine needs no bush," and to further call attention to the many attractive and useful features of this book would be unnecessary as it is so well known.

JELLIFFE.

THE PSYCHONEUROSES AND THEIR TREATMENT BY PSYCHOTHERAPY. By Professor J. Dejerine and Dr. E. Gauckler. Translated by Smith Ely Jelliffe, M.D. J. B. Lippincott & Co., Philadelphia.

The translation of this work, comment upon which was made in our Book Chat some time ago, has just appeared from the press of J. B. Lippincott & Co. It makes a very creditable volume from the standpoint of the publisher's art, and a very useful one to the practitioner. Dejerine takes the well known standpoint so manifest in most of his teaching, that the psychoneuroses are primarily of emotional origin. This is sound physiology and follows the well known lines of practically all modern interpretation of mental phenomena, namely that the instinctive life, which is largely emotional, plays a much more manifest rôle in guiding conduct, in its healthy as well as in its sick manifestations, than does the intelligence. As intelligence is of much later origin in the course of evolution than feeling, it is quite comprehensible that Dejerine's thesis needs very little proof.

The work is divided into three parts. In the first the authors outline the rich symptomatology found in the psychoneuroses. In the second the discussion of the psychological nature of the symptoms is taken up, while in the third the therapy is considered. This leads to a certain amount of duplication, and also some tautology, which however is no drawback to the work, although at times it renders it somewhat prolix. Rather, this reiteration has its uses, inasmuch as the subject of the psychoneuroses is of such transcendent importance, and becoming more so every day, that driving home some very homely truths is after all highly desirable.

The general attitude of mind in the book is to discuss the symptoms. The authors do not attempt clinical pictures. They therefore take up the symptoms as they appear in various somatic organs—respiratory, gastrointestinal, genitourinary, cardiac, etc. The symptoms are graphically portrayed, even if somewhat hastily sketched and throughout the emphasis is laid upon the emotional content. One sees at once that Dejerine would get away in part from the dialectics of Dubois, although probably, as a matter of actual practice, any discussion of symptoms such as portrayed in the third part of the book would lead naturally to considerable dialectical exposition.

The main emphasis, however, is laid upon the rôle of persuasion, upon the camaraderie and good humor of the physician, trusting as it would seem largely to the reconstructive forces of nature for the results. It can be readily seen that such a mode of approach to the psychoneuroses is highly desirable, that good humor, wit, fellow feeling, honest dealing all have their practical applications. It can also be seen that the analyses of the situations are more or less superficial, which perhaps is economically advantageous to both patient and physician.

There is practically no mention made of the psychoanalytic mode of approach developed by the Freudian school, although it can be very readily seen from Dejerine's portrayal that should he go a little deeper into the histories of the cases the psychological importance of mismanaged libido expressions in the various somatic organs of the body would become evident. Dejerine's belief in the functional is quite similar to the Freudian attitude, although Dejerine stops with the conscious functional, whereas the Freudians demand the unconscious as well as the conscious exposé of motives.

The translation has much to command it, as well as at times certain features of inequality. This slight inequality, however, should not seriously deter from the great value of the book which is practical even if not so intellectually satisfying as a more pragmatic dealing with the situation.

L. BRINK.

STAMMERING AND COGNATE DEFECTS OF SPEECH. By C. S. Bluemel. G. E. Stechert & Co., New York.

Two volumes of approximately 400 pages each are devoted to defects of speech by the author. He has set himself in the first volume to solve the problem of the psychology of stammering and among his more fundamental postulates he attempts to set forth that: "The true theory of causality must explain all the facts. It must explain the fact that the stammerer can usually sing without difficulty. That the stammerer can speak well when alone. That the stammerer is usually fluent when speaking in concert with other people. That the stammerer can usually repeat fluently the words that are pronounced for him by other people by way of assistance. That the stammerer can usually repeat a word that he has eventually stammered out. That consonants followed by short vowels are more difficult for the stammerer than consonants followed by long vowels. That consonants at the end of a word never occasion difficulty. That the stammerer may have difficulty on words that commence with vowels. That the speech defect may assume the most diverse forms, being in one case passive, and in another active and boisterous. That one can stammer in thought as well as in speech. That there are more male than female stammerers. That stammering is rarely acquired after the fifteenth year," etc. As a result of these theses he develops a psychological theory which is presented in the first volume.

He further contributes a rather scathing criticism of a number of the contemporary systems which are found throughout the civilized world many of which, he says, are entirely devoid of merit, and are recorded merely because they are gold bricks daily sold to stammerers by a fraternity of speech specialists. He is particularly hard upon many elocutionary methods, and maintains that progress is hampered by charlatans who rob the stammerer and bring everything and everybody connected with the investigation of stammering into disrepute.

The author in developing his hypothesis discusses first: various types of eye mindedness, ear mindedness, relation between mental imagery and voluntary speech, aphasia by which pathway he arrives at stammering. These two disorders, stammering and aphasia, he holds are allied in many respects. He calls stammering a form of auditory amnesia which, however, is not due to any organic disturbance in the speech area. Auditory amnesia is a *sine qua non* of the disturbance and is responsible for what he calls "pure stammering." Another type of stammering he designates as "secondary spasms," paroxysms occurring through misdirected effort, whereas a third type he describes as due to distortion of the verbal image. Mental confusion and fear are put down as collateral causes which complicate the amnesia, which the author believes lies at the base of the disorder. It is to be regretted, however, that he has not made a more careful analysis of the factors of fear which after all show that stammering has nothing whatever to do with auditory amnesia but is a compulsion neurosis with well-defined mechanisms.

The second volume takes up the systems of training. Here some very pertinent remarks are made regarding Professor Cheat'em's stammering schools. The author is particularly energetic in his denunciation of some home courses.

The work is a very useful one, but presents some of the defects against which much vituperation is directed.

JELLIFFE.

PROBLEMS OF GENETICS. By William Bateson, M.A., F.R.S. Yale University Press, New Haven.

This book contains the substance of the Hepsa Ely Silliman Lectures which are annually given at Yale University. The purpose of the lectures is to discuss some of the wider problems of biology in the light of the knowledge gained by Mendelian analyses.

How species have come to be has always been a fascinating enquiry. The general evolutionary doctrine is more or less generally accepted, but the more precise outlining as to the manner by which the process has been accomplished is still far from being satisfactory.

Although these lectures were delivered in 1907, they have just been published. The delay has been to the reader's advantage since much positive experimentation along Mendelian lines has been done in the past six years, many of the results of which have been incorporated in the volume.

There are eleven chapters, and about 250 pages. After the Problem of Species is stated, the author takes up Meristic Phenomena, Segmentation, Classification of Variation and Its Nature. He then discusses De Vries's Mutation Theories and finally goes on to set forth the results obtained from the study of Variation and Location, Local Differentiation, The Effects of Changed Conditions, Causes of Genetic Variation, The Sterility of Hybrids and Concluding Remarks.

For the student of the nervous system particularly the general attitude of this book is highly valuable. One can realize more fully the gains obtained by the long struggle for more efficient adaptation, to both somatic and psychical factors which is crystallized in the human nervous machine by turning to the consideration of the simple problems which are here fascinatingly outlined.

In his concluding remarks, the author states that "the many converging lines of evidence point so clearly to the central fact of the origin of

the forms of life by an evolutionary process that we are compelled to accept this deduction, but as to almost all the universal features, whether of cause or mode, by which specific diversity has become what we perceive it to be, we have to confess an ignorance nearly total. The transformation of masses of population by imperceptible steps, guided by selection, is, as most of us now see, so inapplicable to the facts, whether of variation or of specificity, that we can only marvel both at the want of penetration displayed by the advocates of such a proposition, and by the forensic skill by which it was made to appear acceptable even for a time.

"In place of this teaching he has little positive to offer. Direct perception that new forms of life may arise sporadically, and that they differ from their progenitors quite sufficiently to pass for species is possible. By the success and maintenance of such sporadically arising forms, moreover, there is no reasonable doubt that innumerable strains, whether in isolation or in community with their co-derivatives have as a fact arisen, which now pass in the lists of systematists as species.

"All this is, as need hardly be said, an unsatisfying conclusion. To those permanently engaged in systematics it may well bring despair. The best course for them is once for all to recognize that whether or no specific distinction may prove hereafter to have any actual physiological meaning, it is impossible for the systematist with the means at his disposal to form a judgment of value in any given case. Their business is purely that of the cataloguer, and beyond that they cannot go. They will serve science best by giving names freely and by describing everything to which their successors may possibly want to refer, and generally by subdividing their material into as many species as they can induce any responsible society or journal to publish. Between Jordan with his 200 odd species for *erophila*, and Grenier and Godron with one, there is no hesitation possible. Jordan's view, as he again and again declares with vehemence, is at least a view of natural facts, whereas the collective species is a mere abstraction, convenient indeed for librarians and beginners, but an insidious misrepresentation of natural truth, perhaps more than any other the source of plausible fallacies regarding evolution that have so long obstructed progress.

"Nevertheless though we have been compelled to retreat from the speculative position to which scientific opinion had rashly advanced, the prospect of permanent progress is greatly better than it was. With the development of genetic research clear perceptions have at length been formed of the kind of knowledge required and of the methods by which it is to be attained. If we no longer see how varieties give rise to species, we may feel confident that a minute study of genetic physiology of varieties and species is the necessary beginning of any critical perception of their inter-relations. It is little more than a century since no valid distinction between a mechanical mixture and a chemical combination could be perceived, and in regard to the forms of life we may well be in a somewhat similar confusion.

"As yet the genetic behavior of plants and animals has only been sampled. When the work has been done on a scale so large as to provide generalizations, we may be in a position to declare whether specific difference is or is not a physiological reality."

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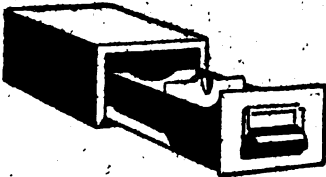
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The Journal OF Nervous and Mental Disease

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Original Articles

HEMIATROPHY OF THE CEREBELLUM IN A CASE OF LATE CATATONIA.¹

BY A. E. TAFT, M.D., AND M. E. MORSE, M.D.

FROM THE LABORATORY OF NEUROPATHOLOGY OF THE HARVARD MEDICAL SCHOOL
AND THE LABORATORY OF THE WORCESTER STATE HOSPITAL

Cases of cerebellar atrophy of a considerable degree are sufficiently rare, and present pictures so varied that each one seems worth reporting. The one here described is a case of atrophy of the right cerebellar hemisphere, restiform body, and the contralateral olive, probably of vascular origin, in a woman who presented the symptoms of late catatonia, with symptoms possibly referable to the cerebellum (ataxia of arms). Anatomically the lesion belongs to the olivo-ponto-cerebellar type of secondary atrophy. A diagnosis of cerebellar lesion was not made during life.

Cerebellar atrophies have been classified from many points of view. The broadest is that of Mingazzini (1). He makes a sharp distinction between agenetic and atrophic processes, using this as the basis of his grouping, and he also correlates the lesions in the cerebellum with those occurring in other parts of the central nervous system. He distinguishes (1) pure uni- and bi-lateral agenesises of the cerebellum, (2) pure uni- and bi-lateral atrophies,

¹ The authors wish to acknowledge their indebtedness to Professor E. E. Southard, of the Harvard Medical School, for his interest in the summarization of the work. Worcester State Hospital Series, 1914, II.

(3) atrophies associated (a) with lesions in the brain, (b) with lesions in the cord.

The classification of Dejerine and Thomas (2) is based primarily upon the histology of the lesions. They recognize (1) a partial or asymmetrical atrophy, usually secondary to a focus of softening or hemorrhage, although exceptionally it may be congenital (agenesis); (2) general or symmetrical (a) of vascular of inflammatory origin, (b) simple or congenital, the cerebellum being smaller than normal, but its component parts normal and proportionally developed, (c) degenerative or parenchymatous, in which the nerve elements atrophy and disappear, but without proliferation of neuroglia.

Cerebellar atrophy due to vascular thrombosis is rare because of the complete anastomosis of the cerebellar vessels; and for this reason also, the lesions when they occur are usually small.

Before going on with the consideration of the individual aspects of the case, it seems well to give a brief outline of the microscopical anatomy of the cerebellum and its connections.

Normal Anatomy of the Cerebellum.—The microscopical anatomy of the cerebellum in man is not altogether definitely agreed upon. Our study of the normal cerebellum is based on the works of Cajal (3), André Thomas (4), Quain (5), and van Gehuchten (6), from which the following résumé is taken:

The cerebellar cortex comprises two broad layers, an outer plexiform layer, and an inner granular cell-layer. Just between these two layers is a third one, made up of a single row of large round or oval cells, (*Purkinje cells*); the largest in the cerebellar cortex. These cells are distinguished by their numerous dendritic processes, which ramify in the plexiform layer. The axone passes into the white substance, terminating in the dentate nucleus. The granular layer consists mainly of small round cells, which give rise to a few short, slender branching processes, and an axone which extends into the molecular layer, where it divides T-fashion into two long horizontal branches, whose endings come in contact with the terminal dendrites of the Purkinje cells. In addition to the small round cells, there is another type,—a large multipolar cell with a short, branching axone. Its dendrites terminate either in the granular or molecular layer. From this it is seen that the plexiform layer is made up mainly of the dendritic processes of the cells of the granular layer, and of the cells of Purkinje. In

addition to this, it contains two layers of cells; an outer layer of a few small multipolar cells, and more deeply, a layer of numerous large cells, the axones of which arborize about a Purkinje cell.

The white substance is made up of an efferent fiber system (projection fibers), which originates within the cerebellum, and terminates outside it; an association fiber system which arises in one part of the organ and ends in another portion more or less distant from its point of origin, and a third or afferent group composed of fibers terminating in the cerebellum, but arising outside of it.

The fibers going to and from the cerebellum do so by means of its three peduncles. There are no commissural fibers.

The inferior peduncle (restiform body) is made up of the fibers of the direct cerebellar tract of Flechsig, from the spinal cord. These form the center of the peduncle and end in the vermis. Also, fibers from the inferior olive, which cross to the opposite side of the medulla and are distributed to all parts of the cerebellar cortex. According to Thomas (7), his experiments on dogs lead him to conclude that the olivo-cerebellar fibers terminate only in the cortex, principally the vermis, and have no direct nuclear connection. This idea is upheld also by Keller (8) and Probst (9), on experimental grounds. Klimoff (10) finds by experiment that the olivo-cerebellar fibers pass through the restiform body to the vermis and hemisphere mainly of the same side.

Besides these, there are small fiber tracts from the medulla, originating in the cells of the reticular portion, and also from the nucleus of the lateral column.

Although the fibers of the restiform body are mainly ascending ones, Cajal and others have found that fibers arise in the dentate nucleus and terminate in the inferior olive.

There is a question whether some fibers from the nucleus gracilis and nucleus cuneatus go to make up a part of the restiform body.

The middle cerebellar peduncle, according to Thomas, is made up of transverse fibers which connect the pontine nuclei with the cerebellar cortex on the same and also the opposite side, terminating in the lateral lobe only. Cajal says most of these fibers go to the vermis. Also, that many bifurcate, the inner branch passing to the vermis, and outer branches to the lateral lobes.

The superior cerebellar peduncle is made up of fibers extending from the dentate nucleus to the opposite red nucleus and thalamus; also an afferent bundle, the indirect cerebellar tract of Gowers, from the spinal cord to the vermis. It is suggested that there may be some fibers descending from the red nucleus to the cerebellum, but if they exist, they are thought to be very few.

THE CASE.—The history of the present case is as follows: A woman, æt. 59, born in United States.

Family History.—Negative.

Personal History.—In disposition patient was irritable and unsocial, made but few friends, and had no interests outside her home. No illness of importance except that related to the psychosis. Habits good.

Psychosis.—At 44 years, patient had an "attack of nervous prostration," in which the chief symptoms were refusal of food, inclination to mutism, and unreasonable anger and excitement. She improved, but remained "very nervous," irritable and notional. She was seclusive and suspicious, and grew indifferent to her household duties and to personal cleanliness. Exhibited little feeling over her husband's death. For six months before admission she slept poorly, and two months before admission had a "breakdown" in which she was excited and turbulent in reaction to visual hallucinations; spent much of her time staring into space. Developed various somatic delusions. Imagined she could not swallow, refused food, and insisted that "her mouth was bad and her ears plugged." When asked to walk she first said she could not, and then began with small steps and stiff-legged. For a few days before admission she was destructive and violent.

Hospital Residence.—16 days. On admission patient was resistive, mute and refused food. She had to be tube-fed during her entire stay.

Physical Examination.—Unsatisfactory because of patient's negativism and restlessness. Pupils were equal and responsive to light and accommodation. Some general hyperesthesia to pin pricks and manipulation. Tongue protruded jerkily in the midline. Irregular contractions of the buccal muscles producing grimacing. Spasmodic short contractions of single muscles and groups of muscles occur especially in hands and arms noticeable in grasping the bedding or pencil. Wrist and elbow jerks not obtained. Knee jerks elicited with difficulty, but are apparently equal. Achilles and plantars brisk and equal. No Babinski. No clonus. No Gordon. Circulatory and respiratory systems and abdomen negative. Incontinence of urine.

Patient continued restless, and slept little. Was disoriented, confused, emotional, irrelevant in conversation, expressing ideas

of sinfulness and self-accusation. On the fourth day after admission patient's temperature reached 103, and she lapsed into a muttering delirium, accompanied by muscular twitchings. Temperature ranged from 100 to 106 (at death).

Autopsy. (13 hours after death).—The gross lesions found in the trunk were chronic pyelonephritis, edema of the lungs, apical scars, slight valvular endocarditis, patent foramen ovale.

Brain.—(The gross description of the brain is by Dr. S. T. Orton who performed the autopsy.)

Calvarium.—Moderately thick. Wide line of diploë. Not particularly adherent except along the midline.

Meninges.—Dura moderately thick, somewhat opaque. Pia thin and translucent, contains no excess of fluid.

Brain.—Weight in toto 1,140 gm. Convolutions are of good width and well approximated throughout with the exception of one small quadrilateral area about 1 cm. in each direction situated just beneath the second frontal sulcus on the left hemisphere, involv-

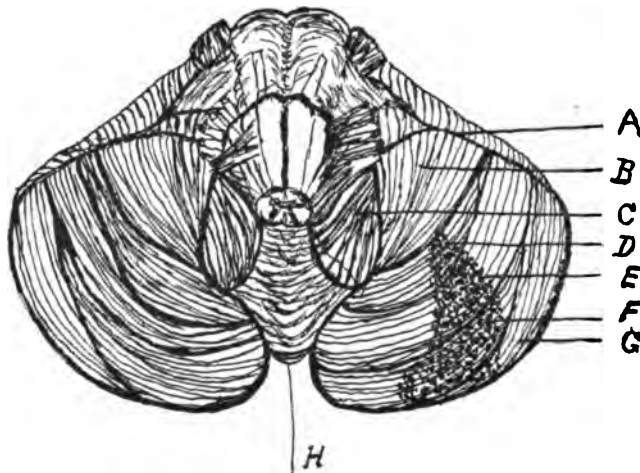


FIG. 1. *a*, Great horizontal fissure. *b*, Biventral lobule. *c*, Tonsillar. *d*, Anterior gracile lobule. *e*, Posterior gracile lobule. *f*, Inferior semi-lunate lobule. *g*, Infero-posterior lobule. *h*, Inferior vermis. Figure 1 shows the inferior cerebellar surface. The blackened area corresponds to the affected portion.

ing a portion of the precentral gyrus and a portion of the third frontal. This area is depressed below the rest of the surface but shows no local reaction of inflammatory type and on section shows no suggestion of loss of cortical or subcortical structures. Its whole condition suggests that of an aplasia rather than a subsequent lesion. Its position as described involves a portion of the precentral gyrus, but low on that gyrus and probably not involving

the motor field. The anterior end of the space covers a portion of the third frontal gyrus above the area which is usually included in the description of Broca's convolution. The convolutions over the frontal pole show little or no atrophy. Consistency of the brain is everywhere moderately firm with slight polar variation. No increase in density in any particular field. The cerebellum shows a very marked difference in the size of its two hemispheres (Figure 1). The left is of normal size. The right very much smaller. The lobus centralis appears normal. The lobus culminis appears normal. The lobus clivus on the left is normal. On the right it is somewhat narrow and is crossed by a deep transverse furrow about two thirds of the way from its origin to the margin. The lobus cacuminis on the right is very narrow. This also is partially cut through by the fissure described under the lobus clivus. On the under surface of the cerebellum the uvula is approximately normal in size, but is displaced markedly toward the right. The tuber valvulæ and pyramid are apparently normal. The recurved part of the lobus culminis which reaches this surface of the cerebellum is approximately the same size on both sides. Flocculus on the right side is much broader and flatter than on the left. The lobus biventralis is very much flattened and broadened laterally on the right. No trace of the postero-superior lobe is found in the right lateral aspect of the cerebellum, but near the posterior cerebellar notch it is represented by a roughly spherical mass the size of a small chestnut. The lateral ventricles are apparently normal, show no granulations. Fourth ventricle is not opened. Basal ganglia appear normal.

Basal Vessels.—Are thin but rather opaque. They show, however, no tortuosity and no plaques of sclerosis.

Estimate of cranial capacity by Rosanoff's (8) method, 1,190 c.c.

Cultures from liver, heart's blood, spleen and cerebrospinal fluid gave no growth on dextrose agar.

The Wassermann reaction on the pericardial fluid was negative.

Microscopic examination of the viscera shows, in addition to the macroscopic lesions, an early bronchopneumonia, and acute splenitis and a chronic thyroiditis.

The thyroid contains a diffuse increase of fibrous tissue and a very heavy lymphocytic infiltrate which in many places obscures the structure of the gland. Comparatively few alveoli are of normal size and contain colloid. The majority are small and are filled with epithelium, or are represented by collections of large swollen cells, staining diffusely pink, and embedded in a mass of lymphocytes. A few of these cells have very large irregularly shaped nuclei, rich in chromatin. The epithelium of some alveoli is desquamated. A number of veins are occluded by thrombi of polymorphonuclear leukocytes and brain.

The microscopic examination of the other viscera gave no essential additional information.

The cerebellum, pons and medulla were fixed entire in formalin, followed by potassium bichromate, and were cut in serial total sections, 25 and 50 microns thick. The majority of the sections were stained by Weigert's method, a few by van Gieson's, Unna's orcein stain for elastic tissue, Mallory's anilin blue stain for connective tissue, and his phosphotungstic acid stain for neuroglia. The mid-brain was cut in three serial blocks and one section of each stained by Weigert's method.

Sections from the pre- and post-central, the frontal, temporal, occipital and hippocampal regions were stained by the Nissl and Weigert methods, Mallory's stain, and Alzheimer's osmic acid-licht-grün method.

The cervical and dorsal cord was cut in 18 serial blocks, prepared by the Weigert method, and one section of each block examined. In addition one block from the cervical, dorsal, and lumbar regions was prepared by Nissl's method, and one from the three levels also by Mallory's method for neuroglia.

Macroscopic examination of serial sections through the entire cerebellum shows a lesion of the right hemisphere increasing in severity from above downward. Considered in this order one finds, first, that the sections farthest frontal, passing through the pons and upper portion of the cerebellum do not include any of the posterior lunate lobules on the right. This is due to the shrinkage in the lower plane. Sections farther down show no abnormality in the superior nor the middle cerebellar peduncles. The posterior lunate lobule appears first as a small branch of the middle lobe. It is only after passing below the great transverse fissure that a definite pathological condition is found. At this point the gracile lobule shows a constriction at the junction of the anterior and middle thirds where the leaflets are much shrunk. The white matter in this plane is about one third the size of that on the left. The dentate and cerebellar roof nuclei are not unusual.

The lower sections show progressive shrinking of the cortex of the right gracile lobule and a loss of the lateral extremity of the inferior semi-lunate lobule. This space is filled by a fragment of the postero-inferior lobule described at autopsy as a "roughly spherical mass about the size of a chestnut."

One finds the same shrunk condition of the cortex as one progresses, and in sections just superior to the plane of the tonsil, the right dentate nucleus loses its ribbon-like outline in its ventral portion, and becomes a nuclear mass. In lower sections one finds the right dentate nucleus relatively much smaller, and the right tonsil about one half the size of the one on the left. Its leaflets are much narrowed and shortened.

The medulla oblongata is definitely asymmetrical. This is due to a very small restiform body on the right (about one third the

size of its opposite) and to the fact that the left inferior olive is much smaller than the right. The accessory olives show no change. This asymmetry of the restiform bodies does not exist in the low pontine sections, nor is the difference in the size of the olives so great in this plane. The condition becomes increasingly noticeable as one progresses downward. The flocculus and para-flocculus are apparently normal.

It has been noted that the superior peduncles are not affected, and this is also true of the red nuclei and the cord. The median lobe and the left hemisphere show no change.

Microscopical Examination: The sections from the cerebral cortex in this case are not without interest. The areas examined were the pre- and post-central, frontal, occipital, temporal, and hippocampal (cornu Ammonis). The findings were: connective tissue increase in pia and about blood vessels, subpial fibrillar



FIG. 2. *a*, Center of lesion. *b*, Tonsillar (atrophied). *c*, Right restiform body. *d*, Left olivary body. Figure 2 shows the most extreme part of lesion in the right hemisphere, the homolateral restiform body and the contralateral olivary body are smaller than their fellows.

gliosis containing amyloid granules (especially in the hippocampal and post-central sections); loss of ganglion cells particularly of the large pyramidal type (with many cell shadows), the condition being most extreme in the frontal and precentral regions; slight general satellitosis of the entire cortex most intense in the frontal and precentral areas and more pronounced in the deep layers of the frontal sections.

The same general condition of peripheral fibrillar gliosis and deep cellular gliosis was found in the Nissl sections of the spinal

cord. The Weigert material of the cord and subthalamie region showed nothing worthy of note.

The center of the lesion is in the cerebellar cortex of the right hemisphere at the point where the gracile lobules spring from the central white matter (Figure 2). Here there is thrombosis of one of the smaller arteries. The surrounding capillaries are injected and stand out prominently in the field. The arterial walls at some points show an extreme hyaline change, and blood cells have escaped into the surrounding tissue. In these areas the lymph spaces about blood vessels are filled with colloid droplets. The reaction of the surrounding nervous tissue is also prominent. It is characterized by a marked general gliosis, with a marked change in the granular and molecular layers of the cortex. This varies from slight thinning to complete loss of granule cells, leaving only shrunken finger-like processes of molecular tissue, with occasional groups of large colloid granules sometimes lying just beneath the molecular layer, sometimes among the remaining cells of the granular layer.

The Purkinje cell loss varies between wide limits. In some areas they are entirely lacking, while in others they lie closely grouped together without regularity of arrangement. The latter condition is due to the extreme shrinkage of the under- and overlying laminae. The individual cells are narrowed and their dendritic processes have largely disappeared, but there is no marked change in their staining reaction.

In the right dentate nucleus and left olive no cells in process of degeneration are found, but there is a general shrinkage of these nuclei and an apparent increase of ganglion cells due to the change. The ventral fold of the olive is the seat of most marked decrease. The condition is one which would naturally follow in a case of degeneration of long standing.

Discussion.—The recent literature presents many cases of cerebellar lesions, but none precisely identical with this one. Many do not report examination of the cord, and others fail to note the condition of the red nuclei. Two recent and valuable studies, one by Vogt and Astwatzaturow (11) and a second by Brower (12), deal with cases of congenital or primary atrophy, and consequently do not stand in direct relation to the present case, which is evidently of secondary origin. Mayor (13) describes an atrophy of the right cerebellar hemisphere in an epileptic imbecile of 32 years. The lesion was confined to the gray matter, and consisted in an absence of Purkinje cells, a reduction in the number of granule cells, a growth of connective tissue, and the presence of corpora amylacea.

The authors' case cannot be classed as one of the olivo-ponto-cerebellar atrophies described by Dejerine and Thomas, although it has some points in common with them. The type they describe is said to be neither congenital, familial, nor hereditary; it has almost no characteristic symptoms,—only those common to cerebellar atrophies in general. The diagnosis is based on the pathological anatomy,—“a primary, systematic, degenerative atrophy” of the cerebellar cortex, the olives and the brachia pontis, which is neither sclerotic nor inflammatory, but a primary cell atrophy of unknown etiology.

The most nearly parallel case is that reported by Cramer (14), though that differs widely in that the focal atrophy was in conjunction with contralateral cerebral atrophy and degeneration of the Purkinje cells. The former was not present and the latter was not complete in this case.

Here, one has to account for the narrowed cortex, atrophy of the dentate nucleus and the opposite inferior olive with spinal cord and red nuclei unaffected. The most definite process is in the area localized at the base of the gracile lobes, where there are marked vascular changes, a surrounding gliosis, and extreme cortical alteration.

Vogt and Astwatzaturow conclude that the degeneration of the inferior olive is in proportion to that of the dentate nucleus, and not in proportion to the change in the cortex, while Thomas finds that purely cortical lesions of the cerebellum may lead to a retrograde atrophy of the olives.

According to Babinski and Nageotte (15), olivary atrophy is not necessarily dependent upon atrophy of the dentate nucleus, but always follows such atrophy when it occurs. This would seem fully to justify the findings of Cajal and others that the two nuclei are directly united, the cells being in the dentate nucleus and the axonal terminations in the inferior olive.

An analysis of the case presented here bears out most of these conclusions, and explains the pathological picture.

Considering the cortex as the primary focus, destruction of the Purkinje cells would cause much narrowing of the cortex by loss of their numerous dendrites, and shrinkage of the dentate nucleus through the disappearance of the terminal branches of their axones. This same lesion would destroy fibers entering that area of the cortex, and would be followed eventually by disappearance

of their cells of origin in the olive. Thus, there would be a proportionate change in all these foci. This view would be supported further by the fact that if there were any considerable cell destruction in the dentate nucleus, some alteration would be found in the corresponding red nucleus, and the fiber tract leading to it, which is not the case.

That the olivary change is dependent on the cortical lesion seems probable from the standpoint of Holmes and Stewart (16), who have demonstrated experimentally that there is a definite relation between the different parts of the inferior olives on one side, and the different zones of the cortex of the opposite cerebellar hemisphere. Thus, fibers from the lateral part of the olives go to the opposite lateral cortex; fibers from the median portion of the inferior olive connect it with the vermis and the median portion of the lateral lobes; fibers from the dorsal portion of the olive correspond to the cortex of the superior surface, and fibers from the ventral part of the olive to that of the inferior surface.

We have already seen that the greatest change is found in the ventral fold of the olive.

The negative findings of the cerebellar tracts of the spinal cord agree with the normal cortex of the vermis, where they terminate.

From the clinical side also, this case presents certain features of interest. In regard to cerebellar symptoms it is questionable how much weight can be put upon the ataxia of the arms described during the hospital residence or the description of the gait given in the admission certificate, as these symptoms were elicited during a katatonic period.

The coëxistence of katatonic symptoms with a cerebellar lesion is interesting both from a theoretical standpoint, and in view of the group of dementia præcox cases with cerebellar lesions which Southard¹⁷ has studied from the Danvers Hospital. His group presented (clinically) katatonic features, while the cerebellar lesion was a sclerosis of the dentate nuclei. The cerebellar lesions in this series were, however, of rather minor extent, and there were lesions elsewhere in the brain (satellitosis, gliosis, and hypoplasia of both postcentral gyri).

Summary.—We here deal with a case of focal unilateral cerebellar disease of long standing (months or years) apparently quiescent (no signs of exudation) and beyond question due in large

measure to arterial thrombosis (no histological or clinical evidences of syphilis; Wassermann reaction negative in pericardial fluid post mortem). The lesion was not in the nature of an old cyst of softening, but is rather the result of gradual shrinkage and induration possibly due to an unusually gradual thrombosis.

The effects of this lesion upon the neurone systems are as follows:

1. Focal absence of granule cells, in places entire and in places partial in the area of involvement (viz., a thumb-sized area of the inferior surface of the *right* lobe, including portions of gracile, inferior lunate, amygdala, and postero-inferior lobule.)

2. In this area many of the Purkinje cells also are lost, but the Purkinje cell loss is not so marked as the granule cell loss and is somewhat variable in amount in the affected area.

3. Fiber-loss is evident in the white matter under the cerebellar cortex: this fiber-loss should according to current theory involve in part at least the cerebellodentate system, *i. e.*, the Purkinje-dentate neurones.

4. The hypothesis of Purkinje-dentate neurone loss is supported by the appearance of the homolateral (right) dentate nucleus, which shows a relatively focal reduction in size, presumably due to the loss of the dentate ends of the destroyed Purkinje-dentate neurones.

5. If this hypothesis (paragraph 4) be correct, a similar hypothesis would need to be made for the contralateral olive. The contralateral (left) inferior olive shows a relatively focal reduction in size, quite comparable with the dentate nucleus reduction.

6. Neither the dentate nucleus area nor the olivary area shows any demonstrable loss of endogenous cells.

7. If no endogenous dentate or olivary cells have been destroyed (and there are no vascular or local lesions in either structure), then it might be inferred that some cerebellofugal neurones run also to the contralateral olive, *i. e.*, that there exist both cerebellodentate and hitherto undescribed cerebello-olivary neurones.

8. Against this hypothesis of hitherto undescribed cerebello-olivary neurones, we may perhaps argue that (1) both the homolateral dentate nucleus and the contralateral olive have actually (though not demonstrably) lost endogenous neurones, and (2) olivocerebellar neurones (well known to exist) and dentatocerebellar neurones (assumed by some to exist in small numbers) have

been lost. This hypothesis requires our assuming a much more extensively and far less focally operative agency than the intracerebellar thrombosis above described.

9. Or again, we may try to reconcile these findings with hitherto recognized neurone systems by supposing the dentate nucleus atrophy to be due to cerebellodentate neurone loss but the olivary atrophy to be due to olivocerebellar neurone loss.

10. The hypothesis of either paragraph 8 or paragraph 9 might be consistent with supposing that the injured distal portions of the dentatocerebellar and olivocerebellar neurones had in some way reacted to produce retrograde effects in the loci of origin: against the view, however, is the absence of any demonstrable cell-loss in these loci.

11. The literature suggests that, whereas (*a*) a cerebellar cortex lesion may be accompanied by characteristic homolateral dentate and contralateral olivary atrophy, yet (*b*) such lesion may also be associated with contralateral olivary atrophy and no sign whatever of dentate lesion. This fact seems to prove that contralateral olivary lesion is not to be explained in these cerebellar cases by reaction at two removes and is accordingly not dependent on dentate nucleus disease. The literature describes a few dentatoolivary neurones, which we might think could have been destroyed by the vascular lesion whose evidence we possess in the cerebellar white matter. As above stated, there is no histological evidence of this.

12. Perhaps the least difficult hypothesis is to conceive cerebello-olivary neurones (hitherto undescribed) to exist. We propose this as a question for the future to decide.

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THE PNEUMOGRAPH. A NEW INSTRUMENT FOR
RECORDING RESPIRATORY MOVE-
MENTS GRAPHICALLY

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Physicians investigate the chest movements in respiration usually by inspection and palpation, and sometimes also by measurement. Precise study of these movements, because of its difficulty, is at present confined mainly to the laboratories of physiologists, pharmacologists, and psychologists. Chest movements can be accurately investigated only if they are graphically recorded. Graphically to record the movements has hitherto required apparatus too fragile for use outside of the laboratory, and technique demanding the aid of a skilled mechanic. The apparatus at present in general use are all built upon the same plan. All have a chest piece which conveys the chest movements to a Marey tambour. The Marey tambour has a rubber membrane. The rubber membrane vibrates to the changing air pressure in the tambour. These vibrations are conveyed to a writing point which records upon the sooty surface of a paper blackened by the smoke of oil or illuminating gas. The blackened paper is affixed to a revolving drum or kymographion. Every movement of the writing point scratches off a portion of the thin layer of soot. After a record has been taken, the blackened paper is varnished.

Those who have had experience with this method of recording know how perversely the rubber membranes of the tambours leak just when the apparatus is most urgently needed. The blacken-

ing of the paper to the requisite degree is a fine art, which is accompanied by a blackening of the operator and the environment. In the fixing of the blackened paper upon the kymograph and in its removal, thumb prints and other undesired records are made. The record of the respiratory curve is limited by the length of the blackened paper which the revolving drums can hold. These difficulties together with the necessity of regulating the driving machinery, adjusting the pressure of the writing point, varnishing and drying of the graphs—all rendered the recording of the respiratory movements a task not lightly to be undertaken in a physician's office.

The instrument we have devised greatly simplifies the task. Our tambours contain no rubber to leak. The recording paper needs not to be blackened and neither varnishing nor drying is necessary. A roll is used instead of a single sheet, so that observations may be continued for prolonged periods. The driving machinery is practically self-regulating. The writing point pressure is self-adjusting. Our instrument makes the recording of the respiration movements, as simple as is the application of electricity.

Our pneumograph consists of two parts, a chest piece to which the respiratory movements are communicated and a recording apparatus which writes those movements.

The Chest Piece (Fig. 1).—The chest piece has a rigid aluminum breast plate (1) which is slightly curved to enable it to be applied closely to the chest. Upon the concave chest surface is a leather pad which is covered by silk. The breast plate is oblong and rests with its long diameter across the chest. A silk ribbon, (11) the suspensory ribbon, suspends the chest piece around the neck. At one end of the convex surface of the breast plate, and at right angles to it is an immovable vertical aluminum plate, the fixation plate (3). At the other end, parallel to the fixation plate is the fulcrum plate (2). The fulcrum plate is attached to the base plate by a hinge. This hinge allows the fulcrum plate to rotate around an axis parallel to the long axis of the body. A silk belt (9) encircles the chest and is fastened by one end directly and permanently to the external aspect of the fulcrum plate. At the other end of the silk belt is an adjusting clamp by which the silk belt can be shortened or lengthened to the size of the chest. This clamp (10) is fixed to the breast plate at the end remote from

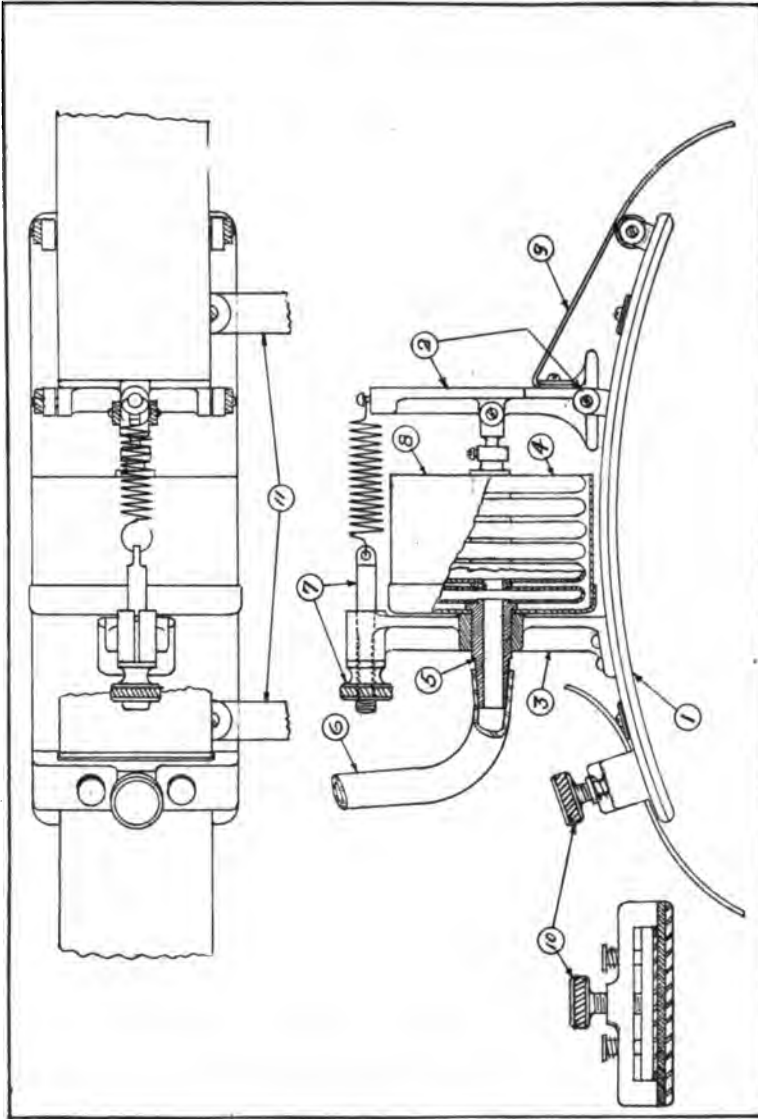


FIG. 1. Description of Parts as Numbered on Drawing of Chest Piece: No. 1, Breast plate lined with leather pad on concave surface. 2, Fulcrum plate showing mode of attachment to breast plate. 3, Fixation plate. 4, Diaphragm or metal tambour. 5, Outlet and hose connection to diaphragm. 6, Rubber hose connecting chest piece to recording apparatus. 7, Tension adjustment rod and nut. 8, Metal protecting cover over diaphragm. 9, Silk belt around chest. 10, Belt clamp for adjusting free end of silk belt to breast plate. 11, Ribbon suspending chest piece around the neck.

the fulcrum plate. The breast plate is thus interposed between the two ends of the silk belt. Changes in the size of the chest are accommodated by the rotation of the fulcrum plate.

Between the fixation and fulcrum plates there is a diaphragm system (4) consisting of metal tambours or capsules. These receptor capsules are similar to those which are used for recording atmospheric and steam pressures, but are more sensitive and are constructed quickly to follow sudden changes of pressure. Each capsule is made of very thin and eminently elastic metal. In the receiving system the metal tambours are placed parallel to one another with their long axis vertical and are connected at their center with one another by short rigid metal tubes. The receptor tambour system is, therefore, concertina shaped. The system is attached at one end to the fulcrum plate; at the other end to the immovable fixation plate. The tambours are enclosed in a metal cover (8) for their protection.

With the increase in the size of the chest during inspiration, the silk belt around the chest pulls upon the fulcrum plate, which then rotates outwards upon the hinge at its base. In expiration, the silk belt is loosened; the outward pull upon the fulcrum plate ceases; and the fulcrum plate is permitted to rotate inwards. This inward movement of the fulcrum plate is produced partly by the elastic recoil of the metal capsules, and partly by the traction of a spring which runs between the fulcrum and the fixation plate and which tends to pull the fulcrum plate inwards toward the fixation plate. The tension of this spring is adjustable by a screw (7, tension adjustment screw).

With each extension of the chest piece tambour system, air is aspirated into it; with each contraction, air is expelled from it. The action is precisely the same as that which occurs in the ordinary rubber-covered capsule—the Marey tambour. The air movements in the receptor tambour system are communicated through a connecting tube (5, 6) to the diaphragm system of the recording part of the apparatus.

The Recording Apparatus (Fig. 2).—The tambour system in the recording apparatus (1) has six metal tambours exactly similar to those in the chest piece. A valve (3) which communicates with the interior of the recording system enables the air in the two systems of tambours to be brought to atmospheric pressure. Every movement of the tambours of the chest piece induces a

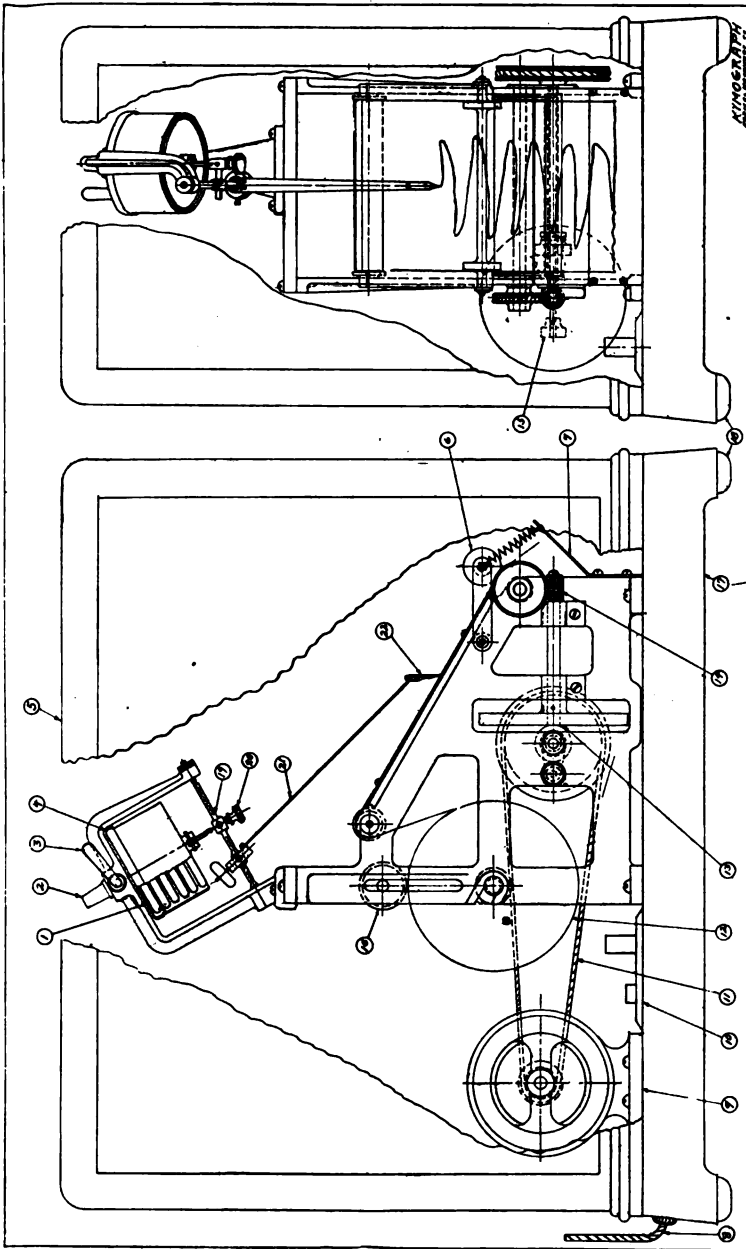


FIG. 2. Description of Parts as Numbered on Drawing of Recording Apparatus: No. 1, Diaphragm or metal tambour. 2, Outlet and hose connection of diaphragm. 3, Air relief valve for adjusting the tension of the air in the tambour system. 4, Metal protecting cover over diaphragm. 5, Glass case, to be removed when using apparatus. 6, Friction roll feed for unrolling paper. 7, Cut off plate for tearing off finished record. 8, Electric wire (plug on end connects to electric lamp socket). 9, Electric motor. 10, Push button switch for starting and stopping motor. 11, Steel wire coiled driving belt. 12, 75 yard roll of paper. 13, Friction drive for changing speed of paper from 4 to 24 inches per minute. 14, Worm and worm gear driving paper feed roll. 15, Push button for adjusting friction feed. 16, Paper weight roll to retard the unrolling of the paper. 17, Heavy iron base. 18, Rubber feet. 19, Pen movement. 20, Stroke adjustment screw for keeping pen arm moving in the center of paper. 21, Pen arm with pen point on lower end and balance weight on other end. 22, Glass pen to be filled with ink.

complemental movement of the air, and with this movement in the recording system, the recording tambours either dilate or contract. The dilatations and contractions of the recording tambours affect a pen arm (19, 21) which is fixed to the sixth recording capsule. At the end of the pen arm is the pen which consists of a small glass tube with a capillary point (22). The tube is filled with a solution of a special stain that, on evaporation, leaves no residue to clog the pen.

The pen writes on white glazed paper which is rolled off a large supply roll (12) by means of a friction roll feed (6), which is driven by a worm screw. The worm screw is rotated by a small motor that can be used either with a direct or with an alternating current. Friction resistances of various sizes permit the speed of revolution to be increased or diminished at will, so that the paper may be unrolled at rates varying from four to twenty-four inches per minute.

The recording part of the apparatus is supported upon a heavy iron base and enclosed in a small, removable glass case. The base is supported on four rubber feet, to minimize the noise and vibration of the motor. On the base are pushbuttons by which the motor may be started or stopped, and the speed of the paper can be controlled.

Method of Using the Pneumograph.—The recording part of the machine is placed upon a table or shelf, so that the tracing surface faces the source of light, and the glass cover is removed. The electric plug from the motor is inserted into a lamp socket (110 volts).

The patient is seated on one side of the machine, in a chair, preferably an arm chair with a high back. The concave padded surface of the chest piece is placed transversely across the front of the patient's chest and the chest piece is suspended around the neck by the suspensory ribbon. The chest belt is then placed around the body under the arms, and its length is adjusted to the size of the patient's chest. Then connection between the chest piece and the recording part is made by means of the connecting rubber hose. When this junction has been made, the writing point of the pen should be precisely in the middle of the paper. If it is not, then the air in the two diaphragm systems is first equalized by unscrewing the exhaust valve (3, Fig. 2), which places both the recording tambours and the receiving tambours

in communication with the outside air, and thus reduces them both to the atmospheric pressure. If the pen be still not in the center of the paper, a small regulating screw (20, Fig. 2), which is placed in front of the recording set of tambours, is turned until the pen is in its proper position. With each inspiration, the pen now moves horizontally upon the paper: with each expiration, the pen returns to its proper position. By means of a push switch (10, Fig. 2), the motor is started. The paper unfolds, its rate is regulated by the switch (15, Fig. 2), and the breathing is traced as a series of curves, by the movements communicated from the fulcrum plate to the chest piece tambours, through the air by the connecting hose (6, Fig. 1 and 2. Fig. 2) to the recording capsules, and thence to the writing point of the pen. As the patient is seated in the same plane as that in which the pen moves, he sees the pen movements as a series of up- and down-strokes; the up-strokes are inspirations; the down-strokes are expirations; plateaus are pauses. The amplitude of the excursion of the pen is regulated by turning the tension adjusting screw on the chest piece (7, Fig. 1).

In the curves traced by the respiratory movements, the imperfections are pointed out to the patient by the physician. The patient closely watching the moving pen, endeavors to prevent and to correct the faults in his breathing, until a normal curve is obtained. When a rest is desired, the motor is stopped by pushing the electric switch and then the silk belt is released from the clamp. To resume the observations, the silk belt is again adjusted and fixed, and the switch pressed. Thus, observations over prolonged periods can be made without trouble. The machine can be employed continuously without preparation other than the renewing of the paper rolls as they are used up. The only limits to the use of the machine are those imposed by the endurance of the patient and the size of the writing paper roll.

Uses.—This pneumograph is of service in all psychogenic speech disturbances such as stammering, aphonia spastica, etc., where breathing exercises are indicated; in the treatment of obsessions and psychogenic fears, which can be beneficially influenced by methodical regulation of the rate and character of the respiratory movements; and in the teaching of conscious control of muscular movements. The machine is also of use in obtaining an index to emotional reactions in mental states. The amplitude,

rate, and rhythm of breathing constitute a much more sensitive indicator of the emotions than the changes in facial expression or in cardiac action. Other uses will readily suggest themselves to physicians. We hope later, by means of multiple chest pieces of a nature similar to that we have just described, to be able to record simultaneously the movements at various parts of the chest, so as to facilitate the study of local chest movements in tuberculosis, hemiplegia, and other conditions in which such study is of paramount importance.

This pneumograph was made for us by the Medical Machinery Company, of Detroit, Michigan. We wish to express our appreciation of the able assistance rendered to us in the mechanical perfecting of the instrument by Mr. Ebert Knauer of that company. To him we are also indebted for the accompanying drawings.

A COMPARISON OF THE WASSERMANN REACTION AMONG THE ACUTE AND THE CHRONIC INSANE

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Previous to September, 1912, at the Warren State Hospital, the practical utility of the Wassermann reaction upon the blood serum was recognized to the extent that all cases suspected of syphilitic taint were subjected to this test. However, there was inaugurated at this time a routine Wassermann reaction upon all new admissions and the information thus obtained was of a surprising nature and proved of inestimable value in the diagnosis of many new cases. Very frequently by this means the attention was first directed to the luetic origin of various mental disturbances, presenting, at first glance, the clinical features of other psychoses. This was especially true in numerous instances of paresis and cerebro-spinal syphilis showing an excitement simulating a manic attack, the disturbed delirium of dementia præcox, or the agitated confusion of an arterio-sclerotic or senile psychosis. This innovation elicited so extensive an array of interesting facts that it was determined to attempt the Wassermann reaction upon all the patients still resident in the hospital who had been admitted prior to the establishment of the routine procedure and who had not yet undergone the blood test. This undertaking necessitated the procurement of 849 specimens of blood. Since the accomplishment of this end with any degree of rapidity, especially when dealing with resistive patients, was entirely incompatible with the ordinary and more detailed methods of surgical asepsis, the following technic was devised:

A sufficient number of attendants were on hand to care for the minor details of the procedure, the patients selected upon each occasion being all assembled in one ward and conducted in turn to the physician in an adjoining room. Over the most prominent vein of the forearm, at or just below the elbow, a spot was selected for the puncture and painted with tincture of iodine, while a

tourniquet was applied just above the joint. The patient being thus prepared, the puncture was affected by the operator and about 10 c.c. of blood withdrawn into a sterilized test tube. The needle was then removed and the wound dressed with a small sterile gauze pad saturated with a one to one thousand solution of bichlorid and secured in place with a loose bandage. The Strauss style of needle was used, a dozen being constantly on hand in boiling water and each one was washed and sterilized as used. During the procedure the operating physician made no other attempt at individual asepsis than by ordinary cleansing of the hands and immersion of the same in bichlorid solution between each puncture, but exercising meanwhile great care to touch no part of the needle except the flange handle in effecting entrance to the vein. This method proved safe and effectual in so much as no local or general infection occurred in the entire series of 849 punctures. The rapidity of the procedure is sufficiently evidenced by the fact that two physicians working in this manner were able to obtain a hundred specimens of blood in periods varying from ninety minutes to two hours according to the class of patients encountered. The mean general average time for a single specimen of blood was estimated at less than two minutes, including the entire period of preparation, operation and dressing.

Eight hundred and forty-nine specimens of blood were obtained by the above procedure from the same number of patients still resident in the hospital who had been admitted prior to September 1912, and whose serum had not yet been tested. These specimens were subjected to the Wassermann reaction by Dr. Paul G. Weston of the pathological department of this hospital with the result that forty-three cases of the eight hundred and forty-nine were proven positive—a percentage of 5.06.

In the seventeen months elapsing since September, 1912, there were made as a routine procedure upon admissions four hundred and fifty-two Wassermann reactions, of which ninety-two were positive, giving a percentage of 20.4. The obvious explanation for the difference in percentage rates, viz., between 5.06 per cent. and 20.4 per cent., for the long resident chronic insane cases and the acute newly admitted psychoses, would be that cases of paresis and cerebro-spinal lues are usually well advanced when committed to an institution for the insane and their hospital residence is brief when a fatal termination ensues. That this is a correct

assumption can be proven by a brief analysis of both series of cases. Taking first the routine series since September 1912, presenting ninety-two instances of positive reaction upon the blood serum, we find that the subsequent course of these cases, proven by spinal fluid examination, physical and mental signs and general clinical course shows that paresis or cerebro-spinal lues existed in fifty-five cases, or a percentage of 12.16. There remain then thirty-seven cases or 8.18 per cent. of the entire number of four hundred and fifty-two cases examined in which syphilis is present, but not to be held accountable for the psychosis. The other series of Wassermann reactions, upon the patients admitted prior to September, 1912, who are still resident in the hospital, may be examined in a reverse order to show the rarity of cases of paresis and cerebro-spinal lues remaining among them at the present time. Pursuant to this line of thought the forty-three cases of positive Wassermann reaction were subjected to the same criteria for diagnosis as were the newly admitted cases, viz., the harmonious agreement of physical and mental findings with clinical course and by the examination of the cerebro-spinal fluid, with the result that but two cases of this number were found to be accounted for as instances in which syphilis can be held responsible for the psychosis either at the time of admission or for its subsequent development. Eliminating these two cases from the forty-three positive reactions found among the eight hundred and forty-nine individuals of the chronic insane group examined, there is left a residue of forty-one cases or 4.94 per cent., which are syphilitic but in whom the luetic taint is not the direct cause of the psychosis.

It is therefore to be seen that with the elimination of paresis and cerebro-spinal lues by the solvent of time from the ranks of the chronic insane, that the incidence of syphilis, as shown by the Wassermann reaction, differs but little from the figures for the probable prevalence of this disease in the community at large. Also by the exclusion of paresis and cerebro-spinal lues from the admissions since September, 1912, there is left a residue of not greatly different proportion of constitutional syphilis (8.18 per cent.), which is presumably not responsible for the psychosis as is found among the chronic insane (4.94 per cent.). Furthermore, the figures of this institution as to the prevalence of paresis and cerebro-spinal lues among admissions (12.16 per cent.) do not greatly vary from those given by other observers. Moreover, the

percentage of positive Wassermann reactions (20.4 per cent.) found among the new admissions to this hospital is almost identically the same as shown by the statistics of similar institutions elsewhere. The following table illustrates the above points.

	New Cases.	Old Cases.
Syphilis present	20.4 per cent.	5.06 per cent.
Syphiils of cerebro-spinal axis....	12.16 per cent.	.12 per cent.
No syphilis of cerebro-spinal axis..	8.18 per cent.	4.94 per cent.

Besides the above purely corroborative interest, our investigation at this hospital has been of value from the fact that a record of a Wassermann reaction upon the blood of every resident patient is now available.

Society Proceedings

FORTIETH ANNUAL MEETING OF THE AMERICAN NEUROLOGICAL ASSOCIATION

HELD AT ALBANY, N. Y., MAY 7, 8, AND 9, 1914

The President, DR. HENRY HUN, in the Chair

PRESIDENTIAL ADDRESS

By Henry Hun, M.D.

The President reviewed briefly the advances in neurology during the past forty years and spoke of the aims of the association as contrasted with those of the American Medical Association. Each has its proper sphere of action. He suggested that the membership of the American Neurological Association might be increased by the election of "adjunct members" for a period of five years, at the end of which time their membership should lapse. During this period these members should be allowed to read papers and should be eligible for election to full membership at any annual meeting. The association has lost by death five members within the past year. Dr. S. Weir Mitchell, Dr. Edward C. Spitzka, Dr. H. A. Tomlinson, Dr. Henry Upson and Dr. Ralph Parsons.

DYSSYNERGIA CEREBELLARIS PROGRESSIVA (THE CHRONIC PROGRESSIVE CEREBELLAR TREMOR)

By J. Ramsay Hunt, M.D.

Under the above title, Dr. Hunt directed attention to a peculiar group of cases, which seems deserving of differentiation as a definite clinical type of nervous disease. The affection is characterized by coarse volitional tremors, which gradually and progressively involve the muscles of the extremities, head and trunk. The tremor disturbance which may be extreme when the muscles are in action, ceases during relaxation and rest.

If these motor phenomena are subjected to a more detailed study, there will be found underlying the volitional tremors, disturbances of muscle tone and of the ability to properly measure and associate muscular movements; the clinical manifestations of which are dyssynergia, dysmetria, hypotonia, adiadochokinesis, and intermittent asthenia. All of these symptoms, including the tremor which is only another expression of the motor disorder, we now associate with disturbances of the cerebellar function.

Dr. Hunt, therefore, regards this affection with its progressive tendency, chronic and definite cerebellar symptomatology, as of organic

origin, caused by a degeneration of certain structures of the cerebellar mechanism which are engaged in regulating the tonus and synergies of muscles.

The clinical picture is therefore characterized by a progressive loss of synergic control (dyssynergia), the most striking manifestation of which is the volitional tremor which accompanies any movement of the affected part whether voluntary, reflex or automatic. (*For further remarks on this symptom-complex see this Journal, p. 510.*)

Dr. Mills said the case of Dr. Hunt's is an interesting one and represents in its detail a type not definitely described. He thought Dr. Hunt means we have here a progressive destructive or degenerative disease of the cerebellum, with what might be called an accumulating functional disturbance of this organ. With a progressive destructive disease of the cerebellum it does not seem likely that we would get exactly this picture. In the well-known cases of cerebellar disease, in which the destructive lesions have been described the symptoms have not been entirely of this character. In localized disease of the cerebellum, as in occlusion of the anterior superior or the posterior inferior artery or any lesion of deficit, his impression was that we do not have a continuous and accumulative tremor but the tremor is nearly always paroxysmal and dependent upon the efforts which are made to synergize movements. He understood here the tremor is present even in the absence of special attempts at movement, except in sleep. Dr. Weisenburg and Dr. Mills have been making careful studies of cerebellar cases and they believe that asynergy is the one fundamental symptom in cerebellar disease. Babinski speaks of asynergy and inertia as the fundamental symptoms, but even inertia may be regarded as a negative expression of asynergy. Tremor like hypermetry and adiadochokinesis are simply special manifestations of this asynergy.

Dr. C. K. Russell said he could recall two cases of this description he had seen. One was a Jewish girl, 20 years old, who came to him about seven years ago. The other was a man about 60 years of age, and they are both, as far as he knows, living. The condition in both is exactly as Dr. Hunt described it.

Dr. Spiller said he had studied two cases of this type with the various symptoms which Babinski has mentioned and to which Dr. Hunt has referred this morning. In one case which occurred some years ago and was reported with Dr. Mills, the diagnosis of multiple sclerosis was made during life. The patient, a woman, had an intense intention tremor and explosive speech. The only lesion found was arteriosclerosis of the central nervous system. There is at present another woman in the Philadelphia General Hospital who has this symptom-complex. Still another case studied by Dr. Spiller was one in which symptoms of multiple sclerosis, especially intention tremor and scanning speech, were caused by cerebrospinal syphilis.

Dr. Hunt said that he was quite in accord with Dr. Mills, as to the importance of asynergia in the cerebellar motor disturbance. For this reason he proposed the name *Dyssynergia Cerebellaris Progressiva*, as best expressing this fundamental symptom, its progressive nature and relation to the cerebellar mechanism.

While the cerebellar symptoms of this disease may occur symptomatically, the slow progressive tendency and limitation of the symptoms are in favor of a degenerative affection of certain special structures of this mechanism.

CONSIDERATIONS BEARING ON THE SEAT OF
CONSCIOUSNESS

By E. E. Southard, M.D.

The reader attempts to correlate consciousness with the *posterior association-center* of Flechsig and possibly rather more intimately with that of the right cerebral hemisphere. The reader views consciousness as a much narrower term than mind, and, if the term mind is to include knowing, feeling and willing, finds consciousness rather cognitive than affective or volitional and believes that will and emotions appear to consciousness rather in a cognitive (kinesthetic) aspect than in any more profound or elementary manner. To put the matter concretely, the reader questions whether it is necessary to suppose *ideas* of words correlated in any sense whatever with operations of Broca's area: Broca's area contains rather the necessary *kinetic schemata* of words. Generalizing therefrom, the reader wonders whether any *ideas* either occupy or are in any sense correlated with activities of the *anterior association-center*, which contains rather the various kinetic and pragmatic schemata that underlie voluntary action and conduct. Data from comparative anatomy and from casualty wards are advanced in support of this conception.

Dr. J. J. Putnam said he had found it difficult to get himself quite into Dr. Southard's point of view, with relation to consciousness and the brain, and did not think he could even yet quite say that he fully understands his meaning. His own view of consciousness is in general accord with that expressed by Professor Edwin Holt in his recent book. In other words, he does not think that consciousness can be spoken of as in the brain any more than in the objects of which consciousness takes cognizance. He believes, however, that the studies of the brain by such means as Dr. Southard has employed, used for the purpose of ascertaining in an empirical way the characteristics of the cerebral mechanism with relation to the conduct and thoughts of the individual, are bound to be of service in so far as they are accurate.

THE CLAIM OF UNCONSCIOUSNESS IN TORT AND
MURDER CASES

By G. L. Walton, M.D.

It is possible for a person to perform apparently purposeful movements and retain thereof no memory. The usual cause for this peculiar psychic state is either a severe blow upon the head, alcohol or some other drug, epilepsy, sleep (somnambulism) or insanity. In tort and murder cases the claim of this variety of unconsciousness is a matter of everyday occurrence, apart from any of the usual causes. At least five hundred such claims have come under the writer's notice.

Dr. Dercum said that in a very large number of criminals he has examined, this claim of loss of memory has been a very common subterfuge. The fact is that those who really are insane never make such a claim. This is a point of great importance. The prisoner will very frequently remember everything in his previous life up to a convenient time of the murder or other crime; then he claims to forget all about the occurrence in question and the lapse of memory is claimed for a variable

period of time subsequently. He will commonly adhere to this position tenaciously.

Dr. J. W. Putnam regarded the question of unconsciousness during time of trial as well recognized, but the unconsciousness that exists after crime and after a person is arrested has recently been brought to his attention by a case in the Erie county jail. There was a prisoner there caught as a burglar who had done very successful work, was arrested and then lapsed into a state of unconsciousness, which he persisted in for 16 days, and during that time he lay an inert mass without any attempt at voluntary motion. He contradicted a good many of the classic statements concerning hysteria, namely that a paralyzed arm, if held over the face, would fall to the side and not strike the face. The arm would invariably fall striking his face. The vomiting would gush so that the vomit would fall back into the face. The contents of bladder and rectum were voided into his clothing so that he contradicted all statements. The reflexes were all normal. Faradism caused contraction of all muscles. He made no voluntary effort of any kind. No opportunity was given to see his pupils. He was fed regularly and at the end of 16 days he gave up the contest. After he came to, and asked for his food, he was questioned as to how he was able to endure the various tests. He said that the electric tests and pinpricks were not so hard to bear because the pain in his stomach for want of food was so much greater. The sticking of pins into him he did not mind at all although he felt them. When asked why he went so long without food, he stated he had read in the newspapers of a woman in London who got out of jail because she refused food and he thought maybe he would be able to do likewise.

Dr. D. J. McCarthy thought it is proper to be skeptical about statements of amnesia. Amnesia without damage to the brain may occur. A boy 14 or 15 years of age, whom he knew, attacked his father and choked him to death. There was no criminal prosecution against the boy, it being reported that he was totally unconscious and knew nothing about the attack. This boy four or five years later developed epilepsy. In court the experts often go too far. They may not know whether the prisoner remembers events occurring during the period of amnesia or not.

Dr. Potts said some years ago a very interesting case came under his observation, in which however the question of criminal prosecution did not enter. A man who had been an epileptic for years, was taken off a train outside of Philadelphia, after he had had an epileptic convulsion and was taken to the University Hospital, from which he was later removed to the psychopathic ward of the Philadelphia Hospital. When admitted he had a number of interesting mental symptoms, but the interesting point in this connection is that for several days he assisted about the wards, performed normal and logical actions, after which he one day inquired where he was and apparently had no recollection of anything that had occurred after being seized with the convulsion on the train. He was an educated man, a graduate of the University of Michigan, and had no reason to malingere. In fact he was only too anxious to leave the hospital when he discovered where he was. A full report of the case will be found in the Philadelphia General Hospital Reports, 1908, Vol. VII, p. 97.

Dr. Knapp thought that Dr. McCarthy has indicated the essential point that we can never absolutely disprove these amnesias in the criminal. Dr. Knapp is very skeptical about accepting such amnesias when reported, but there is certainly a possibility that the mental shock of realizing that the crime has been committed may cause a period of amnesia. In one case

which Dr. Walton has mentioned and which Dr. Knapp examined for the defense, he came to the conclusion that the man was not insane, but on the day he committed the deed he had taken considerable alcohol, and he may have had alcoholic amnesia. It seems to Dr. Knapp perfectly possible, especially in traumatic cases, that there may be a certain amount of amnesia. If the patients do not absolutely lose consciousness they become dazed, faint and have a very slight memory of what occurred. He recalled a case where a lady was thrown from a horse and broke her skull. He was called to see her shortly after the accident. At that time she was in a dazed and confused state, and did not respond to questions asked her. A day or two after he had seen her, her attending physician, who was very competent, said her mentality had cleared quite well. Dr. Knapp saw her again, when she complained of practically nothing but a little headache, and felt a little weak, although in bed she felt all right. She was laughing, talking; wanting to get up. She said she did not remember Dr. Knapp's first visit, but she talked in a perfectly natural manner. Some time afterwards Dr. Knapp was talking with her physician, who told him that she had gotten entirely well, and had remained well ever since, except some loss of smell, but she had absolutely no recollection of ever having seen Dr. Knapp. She was perfectly clear at the time she did see him, and was alert. This is a case Dr. Walton probably would look upon with great skepticism, but there was absolutely no reason for believing that there was any incorrectness in her statement.

Dr. Fisher said we have to consider the question of a motive in all these cases. Epilepsy should not be held as an excuse if between the times of attacks the mentality is normal. If an epileptic commits an act, with a motive, little weight should be given to the fact that he is an epileptic.

Dr. Walton, in closing, said he quite agreed with Dr. McCarthy that amnesia is possible in legal, as well as in extra legal practice. Nor should we hesitate to allow it in a given case simply because the genuine cases are in the minority. We should always remember, however, that we are only giving an opinion, not stating facts, just as we are only giving an opinion when we express skepticism regarding other cases.

(To be continued)

PHILADELPHIA NEUROLOGICAL SOCIETY

April 24, 1914

The President, DR. CHARLES K. MILLS, in the Chair

BULBAR SYMPTOMS ASSOCIATED WITH BILATERAL SIXTH NERVE PARALYSIS

By James Hendrie Lloyd, M.D.

Dr. J. Hendrie Lloyd showed a patient presenting bulbar symptoms associated with bilateral sixth nerve paralysis. The patient was a man, aged about 40 years, who a few months previously had begun to have difficulty in swallowing and in articulating, and who soon after developed a double sixth nerve palsy. When examined by Dr. Lloyd the patient had double internal strabismus, caused by complete paralysis of both sixth

nerves. The pupils were equal and reacted to light and on accommodation, and no other muscle impairment was present in the orbits. The eye-grounds and media were normal. The patient also had almost complete paralysis of the tongue, and great difficulty in deglutition. In attempting to swallow he passed the bolus back into the pharynx with much effort, and in swallowing the normal movement of the larynx upwards was lost. The velum palati was completely paralyzed, except for a trifling movement at the end of the uvula on attempts at saying "ah." The seventh nerve was not involved; the patient could whistle, blow, smile, and show his teeth. Neither was the motor branch of the fifth nerve involved, for the patient could chew. There was no anesthesia in the fifth nerve territory, but there was almost complete loss of sensation in the pharynx and on the soft palate. The pharyngeal reflex was absent. The right vocal cord was immobile, and partly in abduction, showing paralysis of the recurrent laryngeal nerve. The voice was much affected, also speech; and the patient was understood with difficulty. There was almost complete loss of taste and smell. Hearing was intact. The pyramidal and sensory tracts were not affected: the patient could walk normally, and sensation in his trunk and extremities was normal. The patient had no history of syphilis, and the four tests were practically negative. There was possibly a latent tuberculous infection in one lung.

In discussing the pathology, Dr. Lloyd inclined to believe that the case was one of polioencephalitis of rather unusual distribution. That the lesions were nuclear seemed to him most probable; thus the sixth nerves, whose nuclei are in the pons, were implicated along with the ninth, tenth (possibly the eleventh, as shown by paralysis of the velum palati), and the twelfth, which arise in the medulla oblongata. This combination, in Dr. Lloyd's experience, is very unusual. It is an association of sixth nerve paralysis with ordinary bulbar palsy; that is, it is a combination of symptoms of the superior and inferior types of polioencephalitis. The escape of the third, fourth, fifth and seventh nerves was noteworthy.

The X-ray picture in the case showed apparently some involvement of the posterior clinoid processes and of the sella turcica, but Dr. Lloyd did not see how to connect the symptoms with a pituitary lesion; unless, indeed, the loss of smell was to be accounted for in that way.

Dr. William G. Spiller said that he had seen this case with Dr. Lloyd in the hospital and he thought the disease probably was polioencephalitis. Another possibility was solitary tubercle, as the symptoms indicated a focal lesion.

The loss of smell, Dr. Spiller said, did not imply necessarily a lesion implicating the olfactory bulbs. Many years ago Dr. Spiller had a case in which a tumor of the medulla oblongata caused loss of smell, and he explained this loss by interference with the circulation of the cerebrospinal fluid through the foramen magnum and the pressure caused in that way on the olfactory bulbs.

Dr. Charles K. Mills said he had not followed very closely the manner in which the symptoms appeared, but why, after all, cannot this be a case of somewhat irregular degeneration of the bulbar nuclei. There was no optic neuritis and if he recalled aright there was no reason why this case might not have been one such as he had seen of arterial sclerosis with nuclear degeneration. The absence of smell or taste might have some relation to degeneration of the glosso-pharyngeal nucleus. Such degenerations do not always take a perfectly regular course.

Dr. Alfred Gordon said he had an opportunity of observing two cases

of tumor of *adipositas cerebialis*. In both cases the sense of taste was abolished. In both cases there was found a tumor of the pituitary gland. It is possible that the senses of smell and taste may be abolished in diseases of the pituitary gland and in view of the X-ray findings in Dr. Lloyd's case an involvement of the latter is suggestive.

Dr. Lloyd thought Dr. Spiller's theory referred too exclusively to a solitary lesion. He did not think it gave a satisfactory explanation of the involvement of the olfactory nerves, along with the other nerves affected. If we take in the olfactory nerves and at the same time the 6th, the 9th and 10th, part of the nuclei of the 11th, and the 12th on both sides, it makes too much of a lesion to be explained by a solitary tuberculous nodule. If such a thing existed Dr. Lloyd did not see how the 5th and the 7th would escape. In this case we have too wide an area involved of the pons, the medulla oblongata and the base of the brain. Therefore, he felt skeptical about it being a tuberculous lesion. He thought Dr. Mills' suggestion of lesions of the bulbar nuclei was possibly the correct one after all. Dr. Lloyd considered the possibility of a *polioencephalitis inferior* and *superior* of Wernicke. The inferior type of *polioencephalitis* takes in bulbar palsy proper; the superior type takes in lesions of the pons and the mid-brain. In this case the pons and the medulla oblongata were both involved. Dr. Lloyd alluded to the way the symptoms came on and the selective action, as indicative of nuclear lesions. There was no involvement of the lateral tracts or sensory tracts, showing it was not a large solitary compressive lesion. He thought Dr. Gordon's suggestion was interesting. Dr. Lloyd said he had been surprised at the report from the X-ray laboratory, as he was not looking for a pituitary lesion. The fact that the olfactory nerves were involved might suggest a pituitary lesion, but that hypothesis did not explain the involvement of the 10th, 11th, and 12th nerves.

PROGRESSIVE SOFTENING IN THE MEDULLA

By Alfred Gordon, M.D.

Woman, married, 27 years of age, came under Dr. Gordon's observation March 3, 1914, with the following history:

Two weeks ago she suddenly lost her voice. At the same time she developed a dysphagia. When she came under his observation, the following symptoms were noticed:

Patient was unable to utter a sound, to move her tongue in any direction, to move her lips, to close her mouth, to swallow, to move the muscles of the left side of the face and only slightly the right side. Her mouth was open, saliva dribbled constantly from her mouth, the expression of the face was smiling continuously. When told to close her eyes, she did so abruptly, but was unable to keep them closed. The tongue lay motionless on the floor of the mouth. Any attempt to swallow brought on an attack of suffocation. Only a few drops at a time could be placed in her mouth and after some efforts they were partly swallowed.

A few days before Dr. Gordon saw her she noticed wasting of the muscles and weakness in her left hand.

At the time of the examination the knee-jerks were found exaggerated on both sides, the R > L. No ankle-clonus. Babinski was only at times obtainable on the right, but stroking of the left sole gave no response. The

paradoxical reflex was present and constant on the right, absent on the left. The eye examination with the exception of an inequality of the pupils was negative.

Sensations were normal.

Progress of the Disease.—Gradually the power of the left upper limb decreased and a weakness appeared in the lower limb on the same side. The deglutition on the contrary began to improve so that she was able to swallow small quantities of liquid food if given very slowly. The sphincters of the bladder and rectum remained intact. Soon the right lower limb became involved. Its power gradually decreased.

Present condition.—Patient is absolutely helpless in lower and upper left extremities. The right arm is well preserved and normal. She is unable to make the least motion with the affected limbs. The tendon reflexes are exaggerated in the latter, more in the left than in the right leg. Ankle-clonus is present on both sides. Babinski and Gordon are present on both sides. The facies is immobile and she is constantly smiling. The mouth is open, saliva dribbles from her mouth. The tongue lies motionless in the mouth and shows evidences of atrophy; it is exceedingly flabby. Facies is immobile except some slight movements on the right side in its upper half. She is able to swallow some liquid food if it is given in small quantities. She is still aphonic and mute. The pharynx and larynx are anesthetic. She cannot bring the lips together or make any other movement. The small muscles of the left hand are undergoing atrophy and reaction of degeneration is present.

The previous history of the patient shows that at the age of 15 she had an attack of right hemiplegia from which she made a complete recovery.

The Wassermann reaction on the blood serum is negative.

To sum up, we have here a labio-glosso-laryngeal paralysis with an involvement of the nuclei of the 7th nerve more on the left than on the right, considerable involvement of the pyramidal fibers on the right and a certain amount of involvement of the motor fibers on the left, also involvement of the cells of the anterior cornua in the lower cervical region on the left.

Amyotrophic lateral sclerosis was thought of at the first examination, but the progressive involvement of three limbs, first of the left arm, then the left leg and finally the right leg—suggests an original embolism in the medulla oblongata affecting the nuclei of the seventh, ninth, tenth and twelfth nerves on both sides followed by a gradual softening extending to the pyramids.

Dr. Charles K. Mills asked whether there was any loss of sensation.

Dr. Gordon replied none, except allochiria.

Dr. J. Hendrie Lloyd thought from the very sudden onset in this case that it was not an ordinary case of amyotrophic lateral sclerosis. It looked to him more like a case of primary vascular lesion. It might possibly be explained by some obstructive lesion of the basilar or possibly of the anterior inferior cerebellar arteries. The basilar he would be inclined to suspect.

Dr. Alfred Gordon stated that his diagnosis before he observed the paralysis of the lower limbs and left hand was of amyotrophic lateral sclerosis with bulbar onset, but in view of the gradual involvement of the limbs he subsequently thought of softening of the medulla oblongata involving an artery at first and gradually extending further so that the pyra-

midal tract became involved. As to the exact artery involved he could not be sure.

Dr. W. J. McConnell presented A Case of Aplasia of Cranial Nerve Nuclei.

Dr. D. J. McCarthy read a paper on Progressive Lenticular Degeneration.

Dr. Chas. K. Mills said: The paper by Dr. McCarthy on his cases of bilateral lenticular degeneration was of especial value because of the interest now aroused in the subject of the symptomatology of lesions of the basal ganglia since the great contribution by Dr. S. A. Kinnier Wilson to bilateral lenticular degeneration. No doubt can exist as to a symptom-complex of the kind described by Wilson and illustrated to-night by the cases of Dr. McCarthy, but this is not all. It has become clearly apparent that lesions of the lenticula of varying situation and size give different symptom-complexes. The Wilson symptom-complex in its entirety is only obtained when the degeneration of the lenticula is so extensive as to involve almost the entire structure of this ganglion in both hemispheres.

Some of the conclusions at which he and Dr. Spiller arrived in their paper on the "Symptomatology of Lesions of the Lenticular Zone, etc.," published in the *JOURNAL OF NERVOUS AND MENTAL DISEASE*, August and September, 1907, are probably correct, although the symptoms there referred to do not include the hypertonicity, tremor, dysphagia and emotionalism of Wilson's syndrome. It was shown there that anarthric or dysarthric speech disorders result from lesions of some portion of the left lenticula; that destructive lesions of certain portions of the lenticula probably cause a paresis of the limbs or face; that this paresis or paralysis differs from that produced by capsular lesions, the impairment of power not being so severe and not being so characteristic in the former as in the latter case; that it differs from that produced by cortical lesions in that it is less likely to be dissociated, although dissociated lenticular paresis may occur. All these conclusions can be substantiated, but there was something at this time lacking both in the observations and in the method of interpretation.

Dr. Mills felt that we need a new term to express the motor impairment of lenticular disease.

Kinnier Wilson says correctly that the paralysis is not of the ordinary voluntary motor kind, a fact to which Dr. Mills and Dr. Spiller referred when they spoke of the impairment of power differing from that which results from both capsular and cortical lesions.

The particular point which Dr. Mills wished to emphasize and record in this discussion is one to which in different connections he had referred in several papers, namely, that there is an affective emotive or tonectic motor system with a structural basis different from that which is the anatomical substratum of the voluntary motor system. This cerebral affective or tonectic system, motor and sensory, is concerned in function with affective or emotional tone. While it is semi-independent of the voluntary motor system, it forms a junction, both structural and dynamic, with this system. This affective motor system, as regards motor innervation, is subserved by the cerebral extra-pyramidal motor apparatus—especially by the midfrontal and prefrontal cortex, striatum, anterior limb of the internal capsule, ansa lenticularis and nucleus ruber. As regards the voluntary motor innervation, its connections and functions are such that it can both inhibit and increase movement.

In limited lesions of the lenticula, hypertonicity and tremor are not so

markedly present as in large progressive lesions, some of which are probably both destructive and irritative. The hypertonicity, tremor, contracture attitudes and contractions are what might be termed secondary voluntary motor phenomena due to lesions causing withdrawal of affective tone from the voluntary motor apparatus. Wilson properly speaks of destructive lesions of the lenticula causing the withdrawal of a steadying influence from the pyramidal system. In order that this and other lenticular symptom-complexes may be made clear it is necessary to call pure psychology to our aid and remember as Dr. Mills tried to indicate here and elsewhere that there is an affective or emotional tone of sensation, and an affective or emotional tone of ideas and that this tone influences voluntary motor innervation through a special apparatus.

Dr. McCarthy has called our attention to the symptom-complex of Wilson's bilateral lenticular degeneration. The caudate nucleus has received but little consideration from Wilson and for that matter from any other clinico-pathologist. Dr. Mills believes there is a unilateral and a bilateral caudate syndrome and that a special symptom-complex may be postulated which is compounded of lesions destroying at the same time the caudatum and lenticula on both sides. In a case well known to several members of the society, a patient in the Philadelphia General Hospital for more than seven years, the lesions present caused what Dr. Mills designates as the syndrome of bilateral caudato-lenticular degeneration. This case will soon be put on record in complete form in the festival number of the *Neurologisches Centralblatt* to be published in connection with the Bern International Congress of Neurology, Psychiatry and Psychology in September. The patient exhibited the symptoms of Wilson's disease, namely, dysarthria, dysphagia, hypertonicity, contracture attitudes, contractions and emotionalism, but certain symptoms were present not included in Wilson's disease or at least not detailed by him. The most prominent of these was involuntary, painful emotional expression. The spasmodic laughter present in some of Wilson's cases was entirely absent. Other symptoms present were somnolence, vaso-motor and respiratory phenomena, and lowering of temperature.

We are approaching the time when it will be possible to formulate a symptomatology for the caudatum as well as for the lenticula.

Dr. J. Hendrie Lloyd asked how these cases were to be distinguished from the ordinary cases of pseudo-bulbar palsy. As he understood pseudo-bulbar palsy, it is caused by a series of lesions in the lenticula. Some years ago Dr. Lloyd put on record a very instructive case of pseudo-bulbar palsy which presented these recurring lesions of the lenticula. This case was a syphilitic case, and the patient had had four or five recurring attacks of hemiplegia or hemiparesis, until finally he drifted into this condition of pseudo-bulbar palsy, and yet he was not so paralyzed but that he could walk about. The condition seemed to require that there should be recurring rather than progressive lesions in the lenticula of both sides, not necessarily involving the capsule, but in contiguity with the capsule; and the marked symptoms were the dysphagia, dysarthria, difficulty in swallowing, and the automatic laughter and weeping. Dr. Lloyd said he did not profess to know anything about the functions of the lenticula and he had grave doubts whether it had many functions. It may have been of use sometime in the remote biologic history of the race, for in the pre-reptilian brain it constituted pretty much the whole of the forebrain; but ever since the reptilia developed the pallium into the brain cortex, the lenticula and, in fact, the whole corpus striatum may have been largely a

vestigial organ, and to-day may derive its chief importance in pathology merely from its contiguity to the internal capsule.

Dr. Miller, of Toledo, by invitation, said that he had been quite interested in the paper presented by Dr. McCarthy on lenticular degeneration, for he had the privilege of seeing Dr. Wilson's specimens last summer, and he thought that one who had read his monograph and seen his specimens could hardly doubt that what Dr. Wilson had described was a distinct disease entity, a symptom complex, with all respect to Dr. Lloyd's generalizations. Dr. Wilson believed that the liver is ordinarily diseased, that it is in some way the toxic condition which affects the lenticular nucleus. What the pathological process of the liver is he was not certain. Dr. Miller stated that it is not the ordinary known pathological conditions of the liver, that is it is not the ordinary hobnail sclerosis which gin drinkers develop, but is a primary liver disease.

Dr. Cadwalader said that he had recently studied three cases of lenticular disease at the Orthopedic Hospital and Infirmary for Nervous Diseases. The first patient had been sent there from the south to consult Dr. S. Weir Mitchell and was under his care for nearly a year. He was a boy 19 years of age who is said to have acutely developed, when 14 years of age, symptoms of general prostration and mental impairment. His own physician described him as an idiot, but previous to this onset he had been a remarkably bright and healthy boy. After the acute symptoms passed off, he rapidly developed tremor of the right arm which quickly spread over the whole body, involving all four extremities, lower jaw, and the neck and trunk muscles. When he first came under Dr. Cadwalader's observation, muscular rigidity was very marked in all four extremities. This rigidity seemed to be different from true spasticity. There was a constant to and fro regular tremor more marked on the right side. He had dysarthria and dysphagia and his mentality was impaired. He was distinctly childish; furthermore his skin was very much discolored, everywhere it was copperish yellow color. Dr. Cadwalader said that this discoloration he believed to be similar to that described by some of the German authors in cases of probable lenticular disease.

A second case Dr. Cadwalader said he had exhibited before the December meeting of the Neurological Society in 1912 and at that time he referred to this patient's tremor and rigidity as possibly conforming more to the type of movements described by Westphal under the title of pseudosclerosis, but there were many similarities to Wilson's form of progressive lenticular degenerations. This patient had two sisters and a brother both of whom had tremor of the same kind. One of these sisters was mentally much deranged, the others were normal.

Another case was that of a girl of eighteen who had been admitted to the Orthopedic Hospital and Infirmary for Nervous Diseases in the service of Dr. Burr. Curiously enough she had given a history like that of Dr. McCarthy's case. She had had a slight injury of the right hand and when admitted to the hospital she was in a stuporous or vague mental state. This had been attributed to hysteria. Later she developed very marked tremor of the right arm which became more general and very soon the neck muscles were affected and then the muscles of the other three extremities and of the trunk. She also developed difficulty in swallowing and dysarthria. Marked rigidity of the muscles with tendency to contractures gradually developed. The tendon reflexes were all very slightly increased, but equally, the skin reflexes were normal, there was no Babinski sign and no ankle clonus. All the internal organs appeared to be

normal, no abnormality could be demonstrated in the liver. Wassermann reaction was positive, the patient went from bad to worse and died ten months after admission. The post mortem examination showed no gross lesion. Unlike most of the cases previously described there was no softening to be seen with the naked eye in the lenticular nucleus, but serial sections were made through this region and many minute areas of softening could be demonstrated. There was also an overgrowth of glia tissue with some changes in the glia cells. The usual signs of syphilis were absent; there was no round cell infiltration of the pia and no changes of the blood vessels. Nothing else was found. Wassermann reactions were repeatedly negative except at the first time. The liver was not obtained for examination.

Dr. McCarthy said that the difference between the pseudo-bulbar paralysis and the condition in these cases is very great. The cases he had referred to were those in which the condition is of slow onset, slow progression, and with no apoplectic symptoms. There could be no question at all as to the diagnosis of pseudo-bulbar paralysis or of paralysis agitans.

SYMMETRICAL PAIN IN THE HEEL FROM EXOSTOSIS OF THE OS CALCIS

By William G. Spiller, M.D.

Dr. Spiller said there were many causes of pain in the heel and while exostoses of the os calcis are recognized they probably occur with considerable frequency and this cause of pain may readily be overlooked. As illustrative of this condition he reported the following case.

C. A. F., male, 57 years of age, has had two or three distinct attacks of gout in his lifetime treated with great benefit by Dr. C. A. Fife and Dr. David Edsall. His last attack occurred two years ago. He has had chronic disease of the right knee joint for many years. He is a stock broker and has stood much until pain in the feet compelled him to sit more. In January, 1914, he began to complain of pain in his heels, he may have had some pain before this time, but the pain in the right heel was attributed by the patient to the chronic affection of the right knee, and the pain in the left heel was supposed to be from extra weight placed upon this heel in attempt to relieve the right lower limb. He recalled that he had had discomfort in his feet which he attributed to his shoes and had tried to make these more comfortable. During the early winter he had done a little more walking than previously. All venereal disease was denied. It was thought that the pain might be from flat foot and he wore casts in his shoes but was made worse by them. The pain sometimes went above the ankles. It was most severe in standing and walking and was very slight when he was sitting, although he has had some pain in the heels when in bed. He consulted Dr. Spiller, April 1, 1914. An area of much tenderness to pressure was found on the sole of each foot, symmetrically situated at the inner side of the heel. No tenderness was obtained by lateral squeezing of either foot. Tactile and pain sensations were normal in the feet. The Achilles reflexes were normal. Dr. Spiller requested the patient to have X-ray photographs taken of the feet, and this was done by Dr. Pancoast. A spicule of bone was revealed extending downward from each os calcis.

Dr. D. J. McCarthy said that bilateral pain in the heel is often in con-

nection with rectal disease. He had observed this with hemorrhoids and fissure.

Dr. W. B. Cadwalader said that a number of cases of this kind had been observed at the Orthopedic Hospital and Infirmary for Nervous Diseases; and that very often there was some roughening of the surfaces of the other bones of the feet, which could be demonstrated by the X-rays. The condition is essentially an osteoarthritis.

Dr. Charles K. Mills said he had a strong impression that some forty or fifty years ago the great American surgeon, Gross, reported similar conditions of the heel, under the name podalgia.

THE QUESTION AS TO WHETHER TONIC OR CLONIC SPASMS RESULT FROM CORTICAL IRRITATION, WITH THE DESCRIPTION OF A NEW SYMPTOM

By T. H. Weisenburg, M.D.

It is still a question amongst neurologists as to whether tonic or clonic spasms can occur as a result of cortical irritation. Most opinions are to the effect that in a cortical motor irritation clonic spasms are produced and only one author, Redlich, is of the opinion that tonic spasms may occur. It is presumed that cortical irritation causes clonic convulsions and that the tonic spasms are produced by irritation of the so-called subcortical (?) motor centers. The writer believes, and has shown by means of moving pictures in a number of cases of Jacksonian epilepsy, that tonic spasms are brought about if the irritation is massive, that is, if for example, the whole of the arm center in the precentral convolution is irritated there is a tonic spasm of the corresponding arm, but if the irritation is minute clonic spasms result. This is well shown in one of his cases in which there is a tonic spasm of the right face because of the primary irritation of the face center, but in the extension of the irritation upward into the arm center the movements of the corresponding hand and arm are typically clonic.

It is a well-known fact that the Babinski reflex is obtained for a minute or so after a Jacksonian convulsion involving the leg center or its fibers or even following an idiopathic epileptic attack. The writer has observed for some years in a number of cases in which either after Jacksonian attacks involving the leg or in idiopathic epileptic cases in which the convulsion has a tendency to become unilateral, that the Babinski reflex can be obtained from twenty-four to forty-eight hours afterward. In one of these cases with necropsy a tumor was found in the middle cranial fossa pressing upon and irritating the motor fibers in the foot of the cerebral peduncle on one side. As a result of this and other cases he has come to the conclusion that if the Babinski reflex can be obtained from twenty-four to forty-eight hours after an epileptic attack this is indicative of an irritating lesion of the motor fibers somewhere within the cerebrum and that the irritation is probably the result of a tumor. This symptom has not heretofore been described.

The writer has also observed that during an organic Jacksonian convulsion, whether in tonic or clonic stage, that the limbs are held in the same position as in a contracture assumed after an organic hemiplegia. It is sometimes important when observing a convulsion to recognize which side is implicated, for if, for example, there is a spasm in the right lower limb the leg on the left side will also be in spasm, either because of resistance or

otherwise. The involved limb can always be told by the fact that the foot and toes will be held in the Babinski position, whereas the toes on the unaffected side will be markedly flexed.

Dr. D. J. McCarthy asked whether Dr. Weisenburg had ever seen in Blockley that peculiar group of cases which were called "uremic hemiplegia." Whether he did not find in these cases a Babinski reflex lasting twenty-four to seventy-two hours.

Dr. T. H. Weisenburg said that the remarks of Dr. McCarthy only proved what he had said: The presence of the Babinski reflex in uremic hemiplegia indicated that during the hemiplegic attack the motor fibers were implicated, but the important point is that the reflex disappeared after the hemiplegia had disappeared. The point Dr. Weisenburg wanted to emphasize was different. It would perhaps best be exemplified by a very well known patient who has been on the service of a number of the members present. This was a patient who had general epileptic convulsions which had a tendency to become unilateral. After each attack the Babinski reflex could be obtained on one side from twenty-four to thirty-six hours. At postmortem there was found a tumor in the middle cranial fossa which pressed upon the foot of the cerebral peduncle, thereby irritating the corresponding motor column. This symptom was present for years. Dr. Weisenburg had seen this in a number of cases and he has come to the conclusion that a persistent Babinski reflex lasting more than a few hours following an epileptic attack was the indication of a lesion in the motor column somewhere within the cerebrum and that the irritation in such instances is probably a tumor.

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The President, DR. SMITH ELY JELLIFFE, in the Chair

CASES TREATED BY THE MALONEY REST-EXERCISE METHOD

By I. Abrahamson, M.D., and Albert Polon, M.D.

These patients, who were shown by Dr. Polon, had been treated in the Out-Patient Department of the Mt. Sinai Hospital, in the service of Dr. Abrahamson. They were all ambulant cases, suffering from functional neuroses, and were presented to illustrate the value of the rest-exercise method of treatment, the technique of which had been given in detail in a paper by Dr. W. J. M. A. Maloney and Dr. V. E. Sorapure, read at the meeting of this Society on March 3, 1914.¹

The first patient was a girl, nine years old, who for seven months had suffered from a facial tic. The movements, which were persistent and annoying, consisted of extreme deviation of the eye-balls to one or the other side, followed by twitching of the nose and upper lip, by wrinkling of the forehead, and finally, by raising the index finger of the right hand to the nose, as though smelling it. She had been treated by various methods without relief. After two lessons by the Maloney rest-exercise

¹ Relief of States of High Mental, Vascular and Muscular Tension.

method the movements had entirely disappeared, and the girl now showed no sign of the original affection.

The second case was a boy of twelve who had suffered from a facial tic which he had acquired by imitating some one in his class, and which became more pronounced under excitement. After a single lesson of 25 minutes' duration he was entirely relieved by the rest-exercise method.

The third case was that of a girl of 19, a stenographer and typist, who about five months ago, after an exciting occurrence, noticed that her left hand became weak and tremulous. These symptoms gradually extended to the corresponding lower limb and the girl was compelled to give up her work. For thirteen weeks she was under treatment by various methods without any benefit. After two treatments by the rest-exercise method her symptoms entirely disappeared and she was well enough to return to work.

The next patient was a boy of nine years who had suffered from blepharospasm, with more or less constant snuffling and hawking. This boy was still under treatment. Although he was much improved, there was still an occasional slight blinking of the right eye.

The next case was one of hysterical paraplegia in a boy of nine, which dated back three months and followed an attack of otitis media and facial erysipelas. According to the boy's history, the paraplegia came on suddenly: he was unable to stand or walk and was taken to the Beth Israel Hospital, where he remained for five weeks. He was then taken to his home, unimproved, and six weeks later he was carried to the Mt. Sinai Hospital, still completely paraplegic. The case was recognized as one of hysterical paraplegia, and after a single treatment by the rest-exercise method, the boy was able to walk home and had remained well ever since.

In connection with this series of cases, Dr. Polon said he wished to emphasize the fact that by this method of treatment the patients were given self-reliance and confidence, which gave them a feeling that they could control themselves, and they were given to understand that it was through their own will power that they had accomplished these results.

Dr. A. A. Brill said the cases shown by Dr. Polon were very interesting. He wished to call attention to the fact, however, that adult patients with tics usually gave a history of recurrent attacks dating back to childhood. The attacks came and went with more or less periodicity, and could be temporarily checked or mitigated by various methods of treatment, but they invariably recurred and he knew of no permanent cure. He recalled some cases that had been helped by psychoanalysis, but not permanently. Still, any method of treatment that would benefit these patients even temporarily should be encouraged.

Dr. Benjamin Rosenbluth said he had been giving attention to these tics for a number of years and he had come to the conclusion that most of them were referable to some occurrence in the conscious state which was repeated in the dream state. Acting on this theory, he had obtained very good results in the treatment of these patients by giving them drugs directed towards cutting out dreams, without paying any special attention to the patient's physical condition.

Dr. F. K. Hallock, of Cromwell, Conn., asked Dr. Polon if he was familiar with the relaxation method of Anna Payson Call, of Boston. Nearly twenty years ago this young woman began to treat neurasthenia and conditions of nervous hyper-tension by alternate exercise and relaxation movements. With the patient lying prone, she first relaxed the head, then the extremities, and finally rolled the body half way over and let it

sag back in a state of complete relaxation. Dr. Hallock said he had employed this method for the relief of general neurasthenic conditions, and in many cases he had found it very satisfactory. His experience with it in tics has been very limited except as a general procedure for all persons of this type.

The President, Dr. Jelliffe, said that even more remote than the relaxation method of treatment referred to by Dr. Hallock were those in vogue centuries ago in the time of Hippocrates and in the Æsculapian Temple, as well as among the Indian cults. An interesting historical perspective might be thrown upon the present cases in the light of the older methods. In what sense had the newer methods become more definite and precise?

Dr. Polon, in closing, said the most marked difference between this method and the types of relaxation treatment employed in former times and still used in some clinics to-day in Berlin and elsewhere lay in the fact that they depended largely on suggestion and hypnosis, the idea being to dominate the patient without giving him any explanation as to cause and effect. By this newer method which had been employed in the series of cases shown here tonight the treatment rested upon a physiological basis which it was attempted to explain to the patient. The importance of these relaxation movements were impressed upon him, and they were intended to call upon the resourcefulness of the patient to meet the needs of the case.

A CASE FOR DIAGNOSIS

By Louis Casamajor, M. D.

The patient was a man 32 years old, a driver, who was admitted to the N. Y. Neurological Institute on March 26, 1914, complaining of weakness and cramps in his left arm and cramps in his abdominal muscles, the trouble dating back for eighteen months. With the exception of an attack of pneumonia five years ago, his previous history was negative. He denied syphilis.

Present illness: About a year and a half ago he had a sudden attack of pain in the left arm. He visited a clinic, where he was told that he had wrenched the arm and was advised to get an easier job. From this time on, attacks of cramp-like pain occurred at shorter intervals, and ten months ago he noticed that his arm was becoming weak. Whenever he raised his hand to the back of his neck, there was a severe, cramp-like pain in the biceps. Six months ago he began to suffer from similar cramp-like pains in the upper abdominal muscles whenever he bent over. These were extremely painful, causing him to cry out and sometimes to fall.

Examination of the eyes showed nothing abnormal excepting a slight strabismus, a matter of long standing. All the deep and superficial reflexes were active and equal. On the left side there was some atrophy of the shoulder girdle and marked atrophy of many of the smaller muscles of the hand. In the affected arm and forearm, there was about one inch of atrophy. When the patient first came under observation, the arm and shoulder muscles showed many involuntary, lightning-like, disseminated muscular contractions, affecting chiefly the muscle bundles, and seldom strong enough to move a joint. Later, these were not noticeable. When he raised the elbow and placed both of his hands behind his neck, there occurred a severe tonic contraction in the left biceps which was quite painful and had to be overcome by forcible extension at the elbow. The elec-

trical reactions showed extreme hyperexcitability of all the muscles of the left arm, with the myotonic reaction in the left biceps.

The urine was negative, as were the Wassermann and spinal fluid. Under calcium lactate, which was given by the advice of Dr. Walter Timme, the patient had improved, only to have a recurrence of his symptoms when the drug was intermitted.

Dr. I. Abrahamson said that at a recent meeting of the Section on Medicine of the New York Academy of Medicine, Dr. Jesse G. M. Bullowa presented a case as one of myotonia atrophica, and this case apparently belonged to the same category. The speaker thought that the combination of muscular atrophy and myotonia was much more common than was generally believed: he regarded myotonia as a symptom found in connection with many diseases, especially with cord diseases, including syringomyelia. He distinguished two types of the disease, characterized by progressive muscular atrophy and myotonia; a familial type, occurring commonly in more than one member of a family, previously named myotonia atrophica, and an acquired type. It was to the latter group that both Dr. Bullowa's and Dr. Casamajor's cases belonged. In the former case the earliest symptom noted was a disagreeable tonic muscular spasm of the abdominal muscles when the patient tried to rise from bed in the morning. This spasm soon relaxed, and the later abdominal movements were free. Subsequently, a progressive wasting of the shoulder muscles developed. Examination showed decided muscular atrophy; myotonic electrical reactions and polar changes in the wasted muscles. Fibrillary twitchings were present, but not as widespread nor as marked as in Dr. Casamajor's case. In the latter case, no single segment of the cord could be held responsible for so widespread a disturbance. The speaker believed that there was a progressive change in the anterior horns in these cases.

Cases of myotonia atrophica had been described associated with atrophy or mal-development of the testes: this was present in Dr. Bullowa's case, and it was proposed to note the effect of the administration of testicular extract. The result of the treatment could not be seen at this early date.

Dr. I. Strauss said that while he was inclined to agree with Dr. Abrahamson, he would take exception to the statement of Dr. Casamajor that in dealing with a condition of this kind there was any necessity for assuming that it was attributable to any particular segment of the cord or to changes in the anterior horn cells. It was probably due to some change in the muscle itself. What that change was he did not know, but certainly in myotonia atrophica there was nothing to prove that it was a disease of the cord. The pain in these cases was similar to that complained of in muscles where there are circulatory disturbance, such as is not infrequently observed in the lower limbs.

Dr. Casamajor, in closing, said that with such a distribution of symptoms, involving both the abdominal muscles and the shoulder girdle, the lesion, of course, could not be limited to any particular segment of the cord, but this did not preclude the possibility that they were due to spinal cord conditions. Dr. Strauss said he could not see how a lesion of the anterior horns could bring the muscle into such a state of spasm; still, he saw this in toxic conditions, such as strychnia poisoning, which affects principally the anterior horn cells.

Dr. Casamajor said he was interested in the reference made by Dr. Abrahamson of the possible relationship between this condition and atrophy or mal-development of the testes. In his case, calcium lactate was advised

by Dr. Timme on the assumption that the muscular contractions might be due to calcium starvation. When the patient first came under observation, he was incapacitated on account of the spasm of the muscles, and after taking five grains of calcium lactate, four times daily, for a week, he was so much better that he was able to return to work. After a fortnight he gave up taking medicine and within two weeks he was so tied up with cramps that he had to discontinue his work. He was again put on calcium lactate, with an immediate improvement and the disappearance of his fibrillary twitchings.

THE INFANTILE ROOTS OF MASOCHISM

By Paul Federn, M.D., of Vienna.

Dr. Federn said it was Freud who established methodical psychoanalysis, and with its help found unconscious processes underlying most neurotic symptoms. These unconscious processes had their particular laws and mechanisms, and they could neither be subsumed to the physiological processes nor to conscious psychic activity. In the unconscious, instincts found a more unbroken representation than in the conscious psyche, and of these, the sexual instincts played the foremost part.

We were all familiar, Dr. Federn said, with the cases of declared masochism and the sexual perversities reported in many publications, particularly in Krafft-Ebing's standard work. There were individuals who obtained sexual pleasure from processes which seemed far removed from the ordinary procreative instincts. The declared masochist found his sexual satisfaction in his moral slavery to some overwhelming compulsion, or his fancied deprivation of all will, or in being bound or tortured, or forced to vile and inhuman services. Frequently there was combined with masochism also passive algolagnia, i. e., sexual pleasure gained from physical pain. In subjecting such an individual to psychoanalysis, that is, in retracing the chain of forgotten or repressed events and images that had developed in his masochism, one would invariably discover that the sexual perversity dated back to childhood. Binet had suggested the generally accepted theory that such children had been injured by some painful trauma in moments of sexual excitement and the child had then combined the sensations of pain and sexuality so vividly that this association could not be destroyed by the later trend of normal sexual development. Psychoanalysis, however, had discovered deeper causes for these so-called auto-suggestions. In many cases, masochistic fancies had already preceded the trauma; in others, the child had neither suffered any cruel experiences nor had it been influenced by the sight of unusual cruelty. Many of these individuals declared that these masochistic fancies first arose in them suddenly and spontaneously, without any external suggestion. Later, they were surprised to learn that other people experienced the same abnormal desires, and it was then that they discovered the sexual origin of their perversities.

Masochism could frequently be traced back to infancy. This explained why the adult masochist found sexual gratification in the fancies and terrors and desires of his nursery days. In this connection were characteristic his fancied relations to the strong-willed and tyrannical teacher, the unjust or cruel governess, the sensation of being ridden upon or treated like some domestic animal and the memory of his training as a very small child in hygienic cleanliness.

Usually, the masochist indulged no further than fancies. Only a comparatively few masochists tried to realize their perverse inclinations. For the most part they were content with their imaginings, ever widening, and making them more fantastic and increasing to a higher and higher degree their passive slavery to some irresistible and compelling power. Investigation had proven that the sensation of pain was not essential to masochism. What was essential was the idea of passivity. While the normal male instinct tended to action, the masochist found pleasure only in passive acceptance.

Dr. Federn said we but rarely found masochistic tendencies without sadistic tendencies in the same individual. Usually, both were combined in a more or less degree in the normal as well as the neurotic, and as in sexual perverts. The differentiation was only in the quantity of each factor, and from typical cases of combined masochism and sadism he had arrived at a number of important conclusions. He had found that the individual who could assume both sexual attitudes not only played the active and passive rôles in his fancies, but experienced some of the characteristic sensations of both sexes in his genital organs. He had discovered, and other psychoanalysts, particularly Freud, had corroborated his findings, that the sadistic sensations were localized in the glans and the anterior portion of the penis, while the masochistic sensations were usually localized in the perineum and scrotum. The localization of sexual sensation in the perineum and scrotum could only be explained by the probable fact that this part was homologous to the female external organ. The speaker said that in extreme cases of sadism and masochism he had found that the individuals had suffered from some painful affection of the genital organs in childhood. Balanitis, phimosis and paraphimosis, eczema, urethritis, cystitis or the presence of worms, according to his observation, might have an influence on these sexual perversities. Especially, cases of extreme algolagnia may have had their origin—without conscious knowledge of the sufferer—from smarting affections in the undeveloped organs, and to those interested in the mechanism of dreams it would be a valuable proof in that connection to know that even perfectly normal adults might have sado-masochistic dreams when they acquired some painful disease of the genital organs, like gonorrhea.

Being an inhibition of virile sexual activity, masochism in itself was a disturbance of the normal sexual life, and its symptoms would be found in all degrees, varying from a slight reduction of the libido to sexual anesthesia, and even to true psychic impotence. As the masochist was inclined to assume a passive attitude in affairs of life, one could observe the effects of his masochistic tendencies in his undertakings. Very few masochists submitted tamely to their sexual abnormality and to their instinctive passivity without fighting. Most of them felt deeply humiliated by their childish and absurd method of sexual gratification. The more refined and otherwise normal a man was, the more depressed he became by this conflict. Moodiness and continuous depression were therefore the usual neurotic consequences of intense masochism. To sum up briefly, the four chief consequences of masochism were impotence, depression, aboulia and so-called neurasthenia. As to the treatment of this condition, the prophylactic was the most important. In most cases, the neurosis could be traced back to comparatively slight disturbances in infancy and childhood, such as infantile fear, extreme sulkiness, incorrigibility, bad habits, sudden inability to learn, self-isolation and brooding. These different phenomena called for different lines of treatment, especially when we

knew that the child at this time was passing through a period of sexuality. That was why it felt everything more intensely and was excitable, with a secret sense of guilt, and every reasonable and known method of mitigating sexuality should be employed in such cases. Among these might be mentioned diet, sport, and, in cases of physical illness, medical treatment. Children frequently failed to mention pain in their genital organs, and of vital importance was to overcome this secrecy which upset the child. Again and again we were distressed to learn by psychoanalysis of the great and avoidable suffering of neuropathics in childhood, when the torture of abortive sexual expression was much increased by the contempt and harshness or the indifference of their guardians. By using Freud's method of psychoanalysis, the neurologist would gain a deeper knowledge of the origin of mental diseases and of the child's mental development, and by deepening and spreading that knowledge, the road would be cleared for the progress of mental hygiene.

Dr. A. A. Brill said that through Dr. Federn's previous published writings on this subject, he had become acquainted with his views, and in the main he agreed with him. More particularly, he could corroborate in a few cases from personal clinical observation the locations given by Dr. Federn.

In connection with this subject, Dr. Brill reported the case of a man, 43 years old, a successful politician and very forceful man, who had held the highest political position in his own State, who for years had suffered almost nightly from fancies of a masochistic nature, lasting several hours, before he could fall asleep. Investigation showed that this man, who in his daily life was regarded as a big fighter, was just the opposite in his fancies. He was burdened by hereditary weakness, having had a very brutal mother and a sadistic teacher.

Dr. C. P. Oberndorf said that he had been much interested in the fact that Dr. Federn appeared to emphasize an organic basis for masochism—attributing it to a hyperirritability in the region of the perineum. If this tendency is considered primarily one of an anomaly in development, Dr. Federn's view is similar to that which Ferenczi recently adopted in regard to homosexuality. In a very enlightening discussion of homosexuality in the male, Dr. Ferenczi claims that the active form of homosexuality is a neurosis, while the passive form is due to an intermediate organic sexual development and therefore not amenable to psycho-analysis. He has never cured a case of passive homosexuality, nor for that matter, completely cured the neurotic or active form of homosexuality.

The speaker asked how far, in view of Dr. Federn's organic conception of masochism, he had been able to influence his masochistic patients by psychoanalytic treatment.

Dr. Abrahamson said he was rather inclined to doubt the proposed localization of masochistic and sadistic sensations, as pointed out by Dr. Federn, as we frequently saw both varieties in the same patient. He recalled one case which he saw in Munich, that of a medical student apprehended for flagellating a young boy. In him, both perversions were constantly present. In the absence of partners for his activities, he resorted to symbolic representations of these acts, so that at one sitting, he would depict an entire week's program, sadism alternating with masochism; he seemed to revel in his diagrams, and asserted that the sexual gratification he received therefrom was only a little less pleasurable than the actual. Surely in a case of this kind localization of sensations was out of the question.

The president, Dr. Jelliffe, said he was very glad that Dr. Federn had called attention to the prophylactic aspect of this subject of masochism and in tracing these sensations back to childish habits. The desire of the child to lock himself up, the common expression "I will die some day and you will be sorry" were probably familiar to us all, and even into adult life we carried similar types of reaction that something might happen to us whereby somebody else would suffer. We get very sorry for ourselves. The style of French literature referred to by Dr. Federn had its prototype in this country in the tales of Nick Carter and Deadwood Dick, etc. Many examples of sadism and masochism could be observed in our everyday life, in the cruel father, the over-tender attitude of the mother, the exaggerated sympathy poured out on criminals, the misdirected efforts of anti-vivisectionists and anti-vaccinationists, and perhaps the prevention of cruelty of animal advocates and even the anti-suffragettes belonged in the same category.

Dr. Federn, is closing, said he quite agreed with Dr. Brill that many masochists were energetic fighters in their particular social and business spheres: this was especially true of some individuals who, yielding to their abnormal sexual desires, freed themselves from the passive attitude in their general life.

To enter fully into the question that Dr. Oberndorf had raised would mean to open the discussion of the whole problem of psychoanalytical therapy. We were far from able to make normal every case of masochism. The aim of medical treatment was to free the individual from suffering; not to change his character. We all knew of many worthy people, quite normal in other respects, who had sadomasochistic tendencies which they were able to govern or to endure without suffering. If by treatment we achieved this state in our patients, we had done our medical duty, but in many cases we were able to go beyond this point, and to combine with it some educational influences. Many patients who disliked their sadomasochistic tendencies became normal sexually after psychoanalytical treatment. By making conscious many unconscious roots or fixations of abnormal sexuality, and by removing the unconscious resistances to normal sexuality, psychoanalysis led such patients to return to the line of normal development, which meant that following the sadistic and masochistic periods in childhood, normal sexuality became dominant. In many cases the masochist must go back to the preceding sadistic period and live a renewed sadistic attitude during the treatment, but an adult who developed will power and was aided by the psychoanalyst might succeed in sublimating his sadism, and shifting it to his social work. Such individuals developed by treatment a much greater energy in social life than they ever had before. In many cases, however, where the patient's environment was unfavorable or his constitutional traits fixed, no real cure was possible.

Dr. Abrahamson had mentioned a very interesting case from Kraepelin's clinic, and the speaker said he agreed with him that it was a remarkable fact that in this case the patient himself produced his symbolic fancies. The case mentioned corresponded in nearly every detail to the description he had given, as this related to the combination of both perversities. All these symptoms seemed very complicated until we found the key to the trouble. Most probably, had Dr. Abrahamson's attention been directed to that point, he would have found the difference of localization and sensation corresponding with the sadistic and masochistic attitudes, so far as the first sensation was active in the anterior and the other in the posterior part of the organ.

Translations

VAGOTONIA

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER AND DR. LEO HESS
OF VIENNA

TRANSLATED BY WALTER MAX KRAUS, A.M., M.D., AND
SMITH ELY JELLIFFE, M.D., PH.D.

(Continued from p. 537)

GENERAL OR LOCAL VAGOTONIA

We shall now proceed to the consideration of these constitutional anomalies.

6. CLINICAL PICTURE OF GENERAL VAGOTONIA¹⁸

We have been enabled to separate from the mass of nervous diseases, which have hitherto been grouped under the names of neurasthenia, hysteria and nervousness, a symptom-complex, a disease picture which we have designated the neurosis, "*vagotonia*." This we regard as a functional, *autonomic system disease*, for the reason that all its symptoms may be identified with those of a state of stimulation of the extended vagus [autonomic nervous system]. As the basis of this there must exist a *vagotonic disposition* in the patient, that is, an abnormal irritability of all or only a few autonomic nerves, which, under the influence of some adequate stimulus, a stimulus which may be less than that which would affect a normal autonomic system, may lead to the development of the symptom-complex vagotonia.

Furthermore, if we consider all the symptoms which are united in one disease in a given patient, as, for example, in nervous dyspepsia, gastric ulcer, cardiac neuroses, or Basedow's disease, we are struck by the daily finding that never, in any given case, do all

¹⁸ The attempt to present our views in the form of a small monograph does not permit us to introduce many detailed histories. Furthermore it has not been possible to include all of the pertinent literature.

of the symptoms of the disease appear, but that, apparently for no reason, we find sometimes this, sometimes that symptom standing out more prominently. We shall show, by means of well-known diseases, that the common bond between the apparently unrelated symptoms is the predisposition to vagotonia which is responsible for the ready activity and increased tone of the autonomic nerves. The disease itself as an etiological factor is to be contrasted with the constitutional predisposition, which in this particular case is the predisposition to vagotonia which implies an exceptionally ready irritability in the autonomic nervous system. On this account vagotonic individuals will in the course of a disease react to the poisons of the disease with different symptoms from non-vagotonic individuals.

On the one hand, the vagotonic constitution may be the basis of a neurosis which may be separated from the group of neurasthenias, while on the other hand it may modify in a definite way the course of various organic diseases. As a matter of fact, many symptoms may be referred to autonomic stimulation, and it is the regular relationship of certain symptoms such as asthmatic attacks and eosinophilia, which may be interpreted in the light of the conception of vagotonia. It is an old diagnostic principle to relate as many as possible of the symptoms to one cause, and we shall be in a position to attribute many symptoms to one cause.

Finally, the recognition of the physiological entity of the autonomic system must lead us, when we find one symptom of autonomic hypertonus, to look further for others, a principle whose heuristic and consequent diagnostic significance is without doubt most enlightening.

(a) *The Vagotonic Disposition.*—How does the picture of vagotonia in man present itself to us? We have to do principally with youthful or middle-aged individuals. Both men and women come to us complaining of some trivial symptom, stomach or intestinal trouble, fear of heart failure, or some "neurasthenic" trouble and are treated as ambulatory patients. The appearance of these people is that of "nervous invalids." Their actions are hasty and precipitous. The color of their faces is often very changeable, now flushed, a troublesome condition for the patient, now fading into paleness. A similar thing may happen when the patient is asked to undress. When they do this, blotchy areas of redness may appear on the skin of the trunk, and arms, which seem to be of a considerable hardness. The hands of these

patient are bluish-red, markedly cyanotic, getting pale when stroked by the finger, damp and cool. Of all of these conditions the patient often makes mention. The palms have a thick skin, although the patient may not have been doing any hard work. These patients complain that they perspire readily, and even over the entire body. In some there are places of predilection for the sweating which are quite characteristic (back, head, face, feet), and often during the examination of this class of patients the sweat rolls from the axilla down the thorax.

Under the influence of anxiety or excitement, the face rapidly becomes moist, and drops of sweat appear on the forehead or nose after mild excitation. Sometimes, one can recognize a vagotonic as he enters the room. Large, often beautiful, eyes, which seem particularly large owing to the widening of the palpebral fissures, give the face an appearance which almost looks like that of Graves' disease. The eye glistens. Usually these people are under nourished, of inferior make up, who with their thick lips, plump nose and somewhat enlarged cervical lymph glands suggest that they may have had scrofula in childhood. Often the anamnesis justifies this impression. The skin of the back often shows fresh eruptions, often scars of an old acne, comedones, on the head seborrhea or scaliness is frequently found. The skin as a whole is moist and never presents the peeling conditions seen in old people, and in young people with severe diabetes.

The mucous membrane of the conjunctivæ is pale, or much reddened by intercurrent conjunctivitis. The palpebral fissures are as has been already stated, usually wider than normal, and as a rule one may see sclera both above and below the corneal margin. These people are often short sighted, and have mild anomalies in the muscular control of the eyes, there being a moderate degree of convergent strabismus. These anomalies show distinct variations parallel with the decrease or increase in the attention of the patient. (If there is not a high degree of shortsightedness.) Although the degree of shortsightedness is not high, these patients can bring objects very close to the eyes, and read at very close range. If they are asked to fix upon a very near object, the ocular axes converge to the maximum, and can be maintained in this condition of extreme accommodation for a correspondingly long period of time. Weakness in the muscles of convergence, Moebius's sign, is never seen in vagotonics. It may or may not be found in Basedow's disease. On the other hand, v. Graefe's sign,

described only in Basedow's disease up to now, is frequently found. While observing these patients, one notices how often they swallow while speaking. They usually say that they have much saliva in their mouths. The tongue is often very much fissured, thick and moist with large follicles at its edges. If it be protruded far out of the mouth, or if one feels the base with the finger, enlarged lingual lymph follicles are felt. The palate is often greatly arched and small, the uvula large, and deviates to one side or the other. The tonsils protrude from their recesses, and are often so large as to meet in the widening. Their surface, often pink in color, is rugged, and concretions, the remains of a former angina, are often found in the tonsillar tissue. These patients say that they get sore throats after the slightest exposure. These anginas are not accompanied by many symptoms, and high fever is an exception, rather than the rule. The throat is often reddened, the surface uneven, granular and covered with phlegm. Not infrequently strings of mucus, or masses of pus from the posterior nares are found hanging on the posterior pharyngeal wall. The pharyngeal tonsil is often much hypertrophied and covered with a purulent exudate. These patients complain of having to breathe through the mouth at night, and of having continuously the sensation of snuffles, and of a stopped up nose. As children, they have usually been operated upon for adenoids, polyps or tonsils. An almost typical phenomenon is the much diminished sensitiveness of the posterior pharyngeal wall and of the entrance to the larynx to tactile stimuli. A tongue depressor can be moved all about the soft palate and pharynx with considerable pressure without a resulting gag or swallowing reflex. Suitable instruments may even be introduced to the pharyngeal opening without inconvenience to the patient, in striking contrast to the otherwise marked irritability. Van Noorden¹⁹ first described this phenomenon in connection with "hysterical vagus-neuroses."

We wish to say that, on the basis of our observation, we regard this phenomenon as entirely unrelated to hysteria.

There are no characteristic findings in the neck. Powerful pulsations of the carotid are as plainly visible as those of the temporals. A suggestion of struma calls to mind a mild Basedoid condition.

¹⁹ Von Noorden, *Hysterische Vagusneurosen*, Charité Annalen, Vol. 18, p. 249. Bucholz, *Vagusneurosen*, Diss., Berlin, 1892.

(To be continued)

Periscope

Brain

(Vol. 35, Part IV)

1. The Endogenous Fibers of the Human Spinal Cord [From the Examination of Acute Poliomyelitis]. F. E. BATTEN and GORDON HOLMES.
2. A Contribution to the Pathology of Chronic Progressive Chorea. J. A. F. PFEIFFER.
3. A Case of Landry's Paralysis with Especial Reference to the Anatomical Changes. J. A. F. PFEIFFER.

1. *Endogenous Fibers in Spinal Cord*.—The authors conclude as follows: (1) The spinal portion of the spinal accessory nerve has a large intramedullary root which extends throughout the upper five or six cervical segments of the spinal cord. (2) The longer descending systems of the dorsal columns—Schultze's comma tract, Hoche's marginal bundle, Flechsig's oval field, and Gombault and Phillipe's triangle—do not contain endogenous fibers in man. (3) The propriospinal fibers of the ventrolateral columns are arranged in man as in other mammals, and conform in their arrangement to the law that the longer fibers lie nearer the surface of the cord. (4) Many fibers in the ventrolateral columns ascend to the brain stem and terminate in the inferior olives, in the formatio reticularis bulbae et pontis, in the nucleus centralis inferior, and probably in the nuclei laterales of the medullæ; others ascend in the dorsal longitudinal bundles as high as the mid brain.

2. *Huntington Chorea Pathology*.—This is a cytological study. The author finds changes in the cortex, the thalamus and the corpora striata. His general findings are as follows: The anatomical findings in both cases were similar. Slight atrophy of the brain with increase of the spinal fluid, somewhat more marked, however, in the first case. Other than a moderate degree of thickening, the meninges appeared normal. Neither dilation of the paracoeles or ependymitis of the lateral or fourth ventricle was present. The smallness in the size of the brain and spinal cord was a conspicuous feature in both cases. Microscopically diffuse degenerative change in the nerve elements of the brain was evident. This degeneration was most severe in the optic thalamus, corpus striatum, the frontal and the pre- and post-central regions. In reference to the medullated fibers of the cortex, a deficiency of the tangential fibers was especially noticeable, and the oblique fibers, forming the interradiary and supraradiary plexuses were similarly affected. The radial fibers composing the radiations of Meynert were well preserved.

The ganglion-cells showed different types of degeneration. While acute degeneration occurred in many of the cells, sclerotic changes were apparently more frequent. The great increase of lipoid pigment within the cells was a prominent feature of the microscopic picture. The Betz cells, with the exception of a few, were remarkably well preserved throughout. The changes in the neuroglia tissue were an enormous increase of the glia-cells and glia-fibers, especially in the lower layers of the cortex.

the corpora striata and thalami, the cells having small pycnotic darkly staining nuclei being the predominating type. The most obvious pathological alterations in the vessels were found in the lenticulate nuclei and thalami. The walls of many of the capillaries were thickened and their lumen sometimes nearly obliterated. An extraordinary number of amyloid bodies were present in the posterior columns of the spinal cord, the thalami and lenticulate nuclei, but were more numerous in the first case.

3. *Landry's Paralysis*.—The writer's conclusions are as follows: The changes in the peripheral nerves on microscopical examination are most interesting, and emphasize the importance of an examination of the peripheral nerves in all cases of acute spreading paralysis, as it seems most probable that the pathology of this condition per se is to be looked for in the peripheral nervous system. In this case the pathological findings are those of an interstitial neuritis, no sensory symptoms or pain on pressure occurred. The motor cells were well preserved through the central nervous system, and the cellular changes which were present could hardly be regarded as having any direct relation to the paralysis, as such cellular alterations are frequently found in other conditions not associated with acute spreading paralysis.

JELLIFFE.

Journal of Mental Science

(Vol. 57, No. 237)

1. The Diploma in Psychiatry. T. S. CLOUSTON.
2. On the Wassermann Reaction in 172 cases of Mental Disorder and 66 control cases, with Historical Survey for the years 1906-1910. H. A. SCHOLBERG and EDWIN GOODALE.
3. The Continuous Administration of Sulphonal, its Dangers and the Precautions to be Adopted. GEORGE M. ROBERTSON.
4. A Note on the Determination of the Opsonic Indices of the Blood in Insane Persons. ALICE BABINGTON.
5. The Production of Indigo in the Human Organism. R. V. STANFORD.
6. Observation on Indoxyl in the Urine of Epileptics. A Preliminary Contribution on Epileptic Metabolism. LEONARD D. H. BAUGH.
7. Notes on Gynecological Conditions Coincident with Mental Disturbance. E. TENISON COLLINS.
8. Metabolism in the Insane. R. L. MACKENZIE WALLIS.

1. *The Diploma in Psychiatry*.—Clouston traces historically the progress of psychiatry as a science especially in the teaching of psychiatry in Great Britain. The final culmination was the institution of the diploma in psychiatry by the universities of Edinburgh, Durham and Manchester, which may be obtained by assistant medical officers after a course of nine months and examinations in: (1) anatomy of the nervous system; (2) physiology, histology and chemistry of the nervous system; (3) pathology, macroscopical and microscopical, of the brain and nervous system; (4) bacteriology in its relation to mental diseases; (5) psychology and experimental psychology; (6) clinical neurology; (7) psychiatry; (8) clinical psychiatry. The advantages of such a course to a hospital service is very obvious.

2. *On the Wassermann Reaction*.—The authors first discuss the salient points abstracted from the literature of the four years (1906-1910) con-

cerning the Wassermann Reaction in general paralysis and other mental disorders. They then present the results of their investigation of 49 cases of general paralysis and over 100 others including cases of "precocious dementia," imbecility, epilepsy and idiocy. Their percentage of positive results in the serum in cases of general paralysis stands about midway between the lowest and highest recorded, while the positive results of the cerebrospinal fluid are the lowest recorded. They found a positive reaction in general paralysis more frequent in the serum than in the spinal fluid. Aside from known cases of syphilis, a positive reaction rarely obtains in cases of insanity other than general paralysis. Sometimes a negative reaction is obtained both in the fluid and in the serum in cases clinically typical of general paralysis, and afterwards proven by autopsy. More than one examination should be made, whether a positive or negative result, before a definite conclusion is reached. The reaction may vary at different times in the same case of general paralysis (cause unknown) and may become negative in a remission. The Nonne-Apelt test is about as reliable as the Wassermann Reaction. A number of tables and an extensive bibliography are included in this able paper.

3. *Continuous Administration of Sulphonal*.—After discussing the dangers and the precautions necessary in the administration of sulphonal, Robertson concludes that the drug may be administered continuously with comparative safety and occasionally in single doses of a moderate size without danger, if there is no idiosyncrasy. It should be given in a soluble form with occasional breaks, especial care being taken to have the bowels regular, to avoid cumulative effects. Kidney disease is a contraindication.

4. *Opsonic Indices of Blood in Insane Persons*.—Fifty-two cases were examined as to their opsonic indices for *B. coli communis*, *Streptococcus faecalis*, *Staphylococcus aureus* and *B. paratyphoid*. There was a distinct lowering of the indices for all psychoses, more marked in the acutely insane, less marked in the chronic psychoses in healthy adults. The recoveries or convalescents, five in number, showed the nearest approach to the normal average.

5. *Production of Indigo in Human Organism*.—Following a discussion of the methods of determining the amount of indigo excreted in the urine, the author examined the hypothesis advanced by some that there is an excess of indigo secreted in akinetic cases. After examining one thousand and fifty-three samples of urine, the excretion of an individual case being followed daily for several weeks, he concludes that there are rapid and considerable changes in the amount of indigo excretion in normal individuals and there seems to be no reliable evidence to connect the amount excreted with any abnormal mental condition of the patient.

6. *Indoxyl in the Urine of Epileptics*.—Baugh has examined especially cases in which serial manifestations occur. He concludes that variations in indoxyl are associated with the fit state, are not dependent on alimentary factors and must be regarded as resultant from the formation of indican under nervous influence. There is a pre-fit indoxyl drop which is also frequently associated with somatic pain and analgesia. This suggests an element of toxemia as an etiologic factor in epilepsy.

7. *Notes on Gynecological Conditions*.—The author, a gynecologist, is of the opinion that whenever an insane woman has symptoms of pelvic disease, she should be examined by an expert, and if disease exists, it should be treated, apart from the psychosis. If, however, no gynecological condition is present, any operation upon the pelvic viscera with the hope of improving the psychosis is to be condemned as absolutely unjustifiable. He

calls attention to the fact that little has been done for gynecological conditions in the hospitals of Great Britain as compared with America and Germany.

8. *Metabolism in the Insane*.—Wallis discusses the metabolism of insane persons as observed in relation to the excretion of three urinary constituents, creatinin, indican and neutral sulphur. The author states his conclusions as follows: (1) The excretion of creatinine in the insane is generally subnormal, and the creatinine coefficient is correspondingly low. (2) The indigo excreted by the insane appears to be derived from sources other than intestinal putrefaction. (3) The neutral sulphur excretion is low, and points to a diminished cellular activity. (4) The results indicate a derangement of cell metabolism in certain psychoses, and suggest the administration of glandular extracts known to produce an increase in metabolic changes.

W. C. SANDY (Kings Park, N. Y.).

Deutsche Zeitschrift für Nervenheilkunde

(50 Band, 5-6 Heft)

1. The Nerve Ramifications of the Inner Half of the Vessel-Walls. GLASER.
2. Biological Reactions in the Syphilogenous Diseases of the Central Nervous System. NEUE.
3. The Pathology of Acute Encephalitis. ROSENBLATH.
4. The Restitution Incidence in Cerebral Paralysis in Their Relation to Phylogenesis and Their Therapeutic Influence. ROTHMANN.
5. Contribution to Our Knowledge of so-called Pseudo-Sclerosis with Co-existent Changes in the Cornea and the Liver. STRÜMPPELL AND HANDMANN.
6. Contribution to the Study of Chronic Progressive Chorea. MARGULIS.
7. Agreeing, Rare Symptoms in Two Cases with the "Thalamic Syndrome." DEJERINE.

1. *Nerves of the Vessel Walls*.—This work is a supplement to that previously published by L. R. Müller and the author. It is chiefly concerned with the nerves of the inner half of the deep layer of the vessel wall. The nerves that are found in the different layers of the vessel wall are for the most part arranged in the form of a net-work. Fine branches of medullated nerve fibers go into the intima. The capillaries are accompanied and surrounded by nerves. It is upon the nerve network of the inner half of the vessel wall and the end apparatus that drugs act. Ganglion cells are found only in the superficial layer of the intima of the organ arteries as the kidney, and in the deep arteries as the aorta and internal carotid. By the finer methods as that of Färbung, ganglion cells are not demonstrable in the deep layer of the adventitia and the media.

2. *Biological Reactions in the Syphilogenous Diseases*. Neue says the expectations of the intensive method of Hauptmann have been realized. In all cases of progressive paralysis, in many cases of tabes and in cerebrospinal lues the Wassermann reaction is positive. In other organic diseases of the central nervous system the liquor not sensitized gives no interception to hemolysis. The intensive method is also a valuable diagnostic help. Sometimes there is found a positive Wassermann

reaction in the liquor with negative finding in the blood serum; if luetic disease is suspected, this promotes the diagnosis. The Abderhalden serum reaction appears in lues cerebri in general only with brain substratum; in paralysis it is mostly from the albumen of the internal organs as from the liver, kidneys and pancreas.

4. *Restitution Incidence in Cerebral Paralysis.* The writer discusses the theories of hemiplegic contraction and argues upon the significance of the pyramidal tracts and the substitution function of the hemisphere of the same side. In the matter of improvement in the residual form of spastic paralysis in man he considers: (1) The possibility of restitution of active, absolute power of movement after cutting out not only the pyramidal tracts, but the entire centripetal conducting paths of the extremity region of the cerebral cortex. (2) In opposition here to the higher animals, the remote appearance of independent function of the phylogenetic, old cortical cells. (3) The distinct influence of restitution of the synergistic movement through the different development in consequence of the outright movements in man. (4) The progressively rising over stimulation of the ganglion cells of the subcortical centers of the brain and of the spinal cord in consequence of the influence worked through centripetal irritation. (5) After complete development of motion restitution of the subcortical centers, the possible influence of the cortex impulses of the hemisphere of the same side.

6. *Chronic Progressive Chorea.*—The author comes essentially to the following conclusions. The clinical picture of chronic progressive chorea consists of the choreiform hyperkinesia and the changes in mentality. The mental disturbance of the early and advanced cases differs but quantitatively. The disease is a progressive weakening of the processes of perception, combination capacity, the memory faculty, the attention and judgment capacity, with irritability, excitability and aggressiveness. The pathological process of progressive chorea consists chiefly of a proliferation of the glial tissue of the cerebrum also partially in the bulb and cerebellum. There is atrophy of the parenchymatous elements of the cortex, particularly of the nerve cells. First the cortex is involved, then the subcortex and finally the tangential and superradiating cortex fibers become involved. The disease is a congenital, degenerative, chronic gliosis. The hyperkinesia is from the irritation of the parenchymatous elements. The process is one of the whole central system and cannot be localized.

YAWGER (Philadelphia).

MISCELLANY

RETROBULBAR NEURITIS. L. N. Francis. (*Journal A. M. A.*, July 4, 1914.)

Two cases of retrobulbar neuritis in young persons for which no adequate cause could be found, except a pronounced acetonuria, are reported. One was in a girl of 8½ years who had been previously exceptionally healthy, the other in a man of 31 who gave a previous history of acetonuria associated with an attack of colitis. Both lived under ideal hygienic conditions and in neither could hysteria, nasal disease and disease of the accessory air-passages, alcohol, tobacco and drugs be found or credited as a cause nor were there any grounds for suspecting chemical or ptomain poisoning. The writer has not found a similar case recorded. Acetone is an index of some toxemia and it appears reasonable that, in certain cases, it might produce a retrobulbar neuritis as indicated in these cases. It should, therefore, be considered in investigating the etiology of this condition.

OCULAR MANIFESTATIONS OF THE TOXEMIA OF PREGNANCY. Dr. Ward A. Holden (*Journal A. M. A.*, July 4, 1914.)

In reporting a case of paresis of the left external rectus and absolute central scotoma in the field of each eye, in a woman pregnant seven months, whose urine contained 20 per cent. of albumin, many cells and was alkaline, the author remarks that little is known of the causes of the ocular manifestations of eclampsia and this case is reported as shedding some light on the question. Immediate induction of labor was advised in order to save the patient's vision, and the patient was delivered of a stillborn child. Within a month vision had returned with the exception of some night blindness. The macular region of the retina, formerly edematous, showed now an abnormal pigmentation. This spread and became more pronounced, seemingly due to the toxic condition of the blood which had produced the other conditions in the eyes. The author cites authorities to show the effect of the altered blood on the pigment epithelium, and asks whether the visual and sixth-nerve symptoms in his case might not have been caused by a bilateral edema of some parts near the optic chiasm, as the temporary character of the optic trouble would not indicate a true inflammation of the optic nerves. He conjectures that an edema, possibly of the anterior lobes of the brain, but more likely of the meninges and periosteum of the optic foramina continuous with the dura mater, caused pressure on the optic nerves and on one sixth nerve which lies near. Hence, it may be that an excess of certain salines in the blood may be the cause of the changes in the pigment epithelium which produce night blindness.

OPTIC NERVE TUMORS. W. G. M. Byers. (*Journal A. M. A.*, July 4, 1914.)

The author says that he has come to the conclusion from his studies, made with the valued assistance of Professor Adami that tumors of the optic nerve growing within its dural sheath can be sharply divided into two main groups—one of which is best described by the term fibromatosis and the other which may be classified as an endothelioma. It seemed to them from their studies that the indeterminate fibrinous tumors, which outnumbered the endotheliomas thirty-five to one, are somewhat liable to take on the characters of the latter. Our knowledge of the clinical course of these growths is not as yet very definite. We know that they are characteristically slow in developing and that recurrences, always purely local, are rare and are perhaps commoner after the endotheliomas than after the fibromas. He says again, what he has previously laid stress on, that in most of these cases the optic nerve tumor is but a part of a neoplasm more or less widely diffused in the cranium and eventually terminating in death. Whether it is possible or permissible to do anything when it is clear that an intracranial portion remains, is still an open question. It is also necessary to consider the primary extradural tumors of similar, histologic character, the few exceptions being frankly sarcomatous. While also slow in growth they are more rapid than the intradural ones, recurrences are more frequent and they are distinctly more menacing to life. The question of advisability of expectant treatment is mentioned. While it might seem advisable in some cases, the author rejects this policy as it is impossible to differentiate clinically the three types of growths and we can never be sure of the size, situation or rate of development. The exophthalmos is often entirely out of proportion to the size of the neoplasm and there is every reason for immediate and early interference. Two

cases are reported illustrating these points. One was operated on by Kroenlein's method through an opening in the external wall of the orbit, but this was not satisfactorily possible and the orbit had to be completely eviscerated. The Kroenlein method is adapted only for small or medium-sized growths. In the second case a modified Knapp method was employed and the neoplasm was completely removed with practically no hemorrhage by means of a stout tonsil snare. This method is adapted for any sized tumor and Byers holds that infection can be disregarded and it is the only one suited for large-sized tumors. These two cases altered his view to some extent with regard to the treatment of such cases and especially impressed on him the greater risk in extradural cases and in the danger of expectant methods.

PAINLESS SPINAL CORD TUMORS. Pearce Bailey. (*Journal A. M. A.*, July 4, 1914.)

After referring to a previous communication on the subject, the author calls attention to the fact that many cases of spinal cord tumor may pass unrecognized because of the absence of the symptom of pain. That pain may be entirely absent while the other symptoms are typical of spinal cord tumor is, he says, no longer open to question, and he reports a case which on account of its painlessness had long been regarded as one of Pott's disease. It was one of intramedullary sarcoma of the lower cervical and upper dorsal cord, of three years' duration. Laminectomy was performed but the tumor could not be removed. The surgical recovery was perfect. Another case illustrating the fact that spinal cord tumors may escape diagnosis on account of the long intervals in which the pain symptoms are absent, is also reported. The lesion was in the cervical cord and had existed for eight or nine years, the motor symptoms gradually progressing but the pain symptoms intermittent. Death followed operation. A third case of extramedullary psammoma of the upper dorsal cord, with no characteristic pains and with surgical recovery after the removal of the tumor, and still another one of intramedullary perithelioma of the dorsal cord, likewise without the characteristic pain, are also reported and still others are mentioned. Bailey calls attention to the importance of early laminectomy in such spinal cases without waiting for the appearance of the characteristic pain referred to the site of the lesion. If this is neglected too long, as it was in some of the cases reported, the opportunity of giving relief may be lost. Out of twenty-four laminectomies performed in the Neurological Institute during the year ending Nov. 30, 1913, there was only one death from the operation. In this it was performed for a suspected tumor of the cervical cord, a very risky location. In view of this slight mortality he feels less hesitation in recommending a more general resort to the operation. The article is illustrated.

Book Reviews

MENTAL HEALTH OF THE SCHOOL CHILD. By J. Wallace Wallin. Yale University Press, New Haven.

Dr. Wallin has here gathered together a series of papers and addresses bearing upon the mental and educational abnormalities of childhood. Educators, he says, physicians, sociologists, penologists, criminologists, lawyers, clergymen, philanthropists and parents welcome any attempt to gain a better insight into the nature, extent and causes of the mental, moral and educational deviation or deficiency of children. The principal contribution that Dr. Wallin offers directs attention to the aid which the practical psychologist and expert educational consultant hopes to render in this important work of diagnosis, identifying, studying and training feeble-minded, backward and mentally abnormal children in the schools. Much of the material presented is of a highly individual and technical nature and cannot be dealt with in a book review. The individual chapters are not as well harmonized as they might be if a coherent book presentation had been in mind. Notwithstanding a certain amount of repetition and scattering in the studies they can be heartily commended to all educators and intelligent laymen.

JELLIFFE.

MENTAL DISEASES. A TEXT-BOOK ON PSYCHIATRY. By R. H. Cole. Physician for Mental Diseases, St. Mary's Hospital, London. University of London Press.

This is a compact volume on what the author calls "insanity." One hundred pages are devoted to general discussion, the rest to various forms of mental disorder. The author uses the word "insanity" throughout as though all mental diseases were one thing. Thus we have the old series of causes, and the old-fashioned attitude of mind in looking at a large group of disorders in which mental symptoms are in the foreground. The chief points of view of interest are that the author accepts the general idea of manic depressive psychosis but still retains the old concepts. He uses a new word in his classification, but maintains the antique attitude of mind, showing that the comprehension of the concept is lacking. Confusional Insanity, a second group, is hopelessly confused. Dementia præcox is utilized. The author makes the statement that memory is generally very much involved, whereas it is highly characteristic of dementia præcox that the patient retains a considerable amount of memory. Take it all in all, the book is retrogressive in its tendency rather than constructive and progressive.

JELLIFFE.

DISEASES OF THE NERVOUS SYSTEM. By Dr. Aldred Gordon. Second edition. P. Blakiston's Son & Co., Philadelphia.

The second edition of Dr. Alfred Gordon's interesting work on nervous diseases has been called for, and that he has succeeded in making a plain

and practical book is evident. We have had occasion to review the first edition in former pages and can only repeat what we have said.

TEXT-BOOK OF PHYSIOLOGY FOR MEDICAL STUDENTS AND PHYSICIANS. By William H. Howell. W. B. Saunders & Co., Philadelphia.

This is the fifth edition of this volume, one of the best representatives of the American school of physiology. We have had occasion to comment upon the earlier editions. We know of hardly any contemporary work on physiology which is so comprehensive and at the same time not so encyclopedic as to defy reading. This of itself is highly desirable at a time when "of making many books there is no end."

THE PSYCHOPATHOLOGY OF HYSTERIA. By Charles D. Fox, M.D. Richard Badger, Boston.

The author has presented an attractive volume on hysteria. It has the drawback, however, of viewing hysteria as a thing rather than as a pragmatic concept. The author gives a somewhat desultory discussion of the sensory disturbances, the visceral and circulatory manifestations and other phenomena, and finally, in chapter 10, takes up the general hypotheses which have been evolved from time to time to explain the situation. These are rather fragmentarily sketched. The whole work is interesting and instructive, but hardly up to the standard of a monograph.

HANDBUCH DER NEUROLOGIE. Herausgegeben von Dr. M. Lewandowsky. Fünfter Band. Spezielle Neurologie, IV. Julius Springer. Berlin.

In three and a half years this monumental work has been achieved and with the present volume brought to a successful finish. It contains with the general index 1,200 pages. Vorkastner has a fascinating chapter on the neuroses of the Viscera, a subject of increasing importance and practically neglected in our neurological literature. Cassirer presents an admirable synopsis of his large monograph on the Vasomotor-trophic neurosis, and also takes up the subject of Intermittent Claudication. Bielschowsky discusses Herpes Zoster; and Flatau, Migraine and its variants. An excellent and complete chapter. Tics, Localized Muscle Cramps and Occupation Neuroses are described in a more or less perfunctory way by F. Mohr. The psychogenetic comprehension is noteworthy by its absence. No one could write a more complete chapter on Disturbances of Speech than Gutzmann. The psychoanalytic work on stuttering is neglected. Wilmanns of Heidelberg has an attractive chapter on Psychopathic characters, while G. Flatau of Berlin writes on Sexual Pathology. Cramer writes on Neurasthenia. Lewandowsky has an excellent chapter on Hysteria in which a far better appreciation of the psychoanalytic standpoint is found than in Lewandowsky's previous writings upon the subject. In many particulars however the Freudian viewpoint is completely missed, but Lewandowsky says there is no doubt but that "repression" is an important principle; that the "infantile sexuality" is "without question" of great importance. Hartmann and di Gaspero write on Epilepsy in a highly suggestive manner, and Wickman of Stockholm has a chapter on Spasmophilia in Children. Wilson of London writes on Progressive Lenticular Degeneration. The final chapter is by Schuster on Trauma and the nervous system. A complete index of the special volumes completes the work.

One can only reiterate what has been already said by us concerning this neurological system; that it is the most complete, noteworthy and trustworthy in existence.

JELLIFFE.

PRACTICAL HORMONE THERAPY. By H. R. H. Harrower. Ballière, Tindall & Cox, London; Paul B. Hoeber, New York.

The author of this book lays no claim to originality. In fact he states that his personal experience with hormone bearing preparations has been that of the average physician. Being however convinced that the subject of hormone therapy is deserving of greater study and application than it has hitherto received at the hands of the general practitioner, he set himself to the task of collating the facts already known and the theories advanced upon the subject. He has not adopted the rôle of critic, but has provided the reader with a résumé of what has been written already on the subject of hormone therapy the rise and development of which he eulogizes as a great achievement. A bibliography at the end of each chapter, together with a glossary of terms and a list of important works on internal secretions at the end of the book, add to the usefulness of what Biedl, in his preface, aptly terms a "guide" to the student in this field of therapeutics.

JELLIFFE

OBJECTIVE PSYCHOLOGIE, ODER PSYCHO-REFLEXOLOGIE. Die Lehre von den Assoziationsreflexen. Von W. von Bechterew. B. G. Teubner, Leipzig.

This extremely interesting and noteworthy book is perhaps the first and most ambitious attempt to present a strictly mechanistic psychology. The readers of Bechterew's *Physiology of the Nervous System* will see in this work of nearly 500 pages the logical outcome of his physiological studies carried into the realm of the psyche. He would correlate the psychical processes with their mechanisms and then give us a true "Reflexology" or objective psychology from the absolutely mechanistic viewpoint. No one could have attempted it without a broad foundation of anatomical knowledge of the reflex activities of the nervous system, of which knowledge Bechterew has drunk deeply and copiously.

The general divisions of the book give very little inkling of the many suggestive features of it. He first speaks of the foundations of psycho-reflexology, and then in 170 pages discusses general principles, and the rest of the book is made up of his special portion. Reflexes and automatisms are first taken up. He arranges most of what are called instinctive actions,—as nutritional impulses, sexual instinct, instinct of motherhood, instinct of self-preservation, social instinct.

Concentrating or integrating reflexes are then discussed. These are followed by symbolic reflexes, under which heading he arranges speech in its articulatory and graphic forms, as well as the general factors of judgment, taste, various estimates of sensations, etc. Personal reflexes are finally taken up.

Probably no more valuable problem could be attempted than the one here embodied. It is highly stimulating, in spite of an extremely diffuse style; many quotations which are not worked over, but apparently thrown in helter skelter, giving the work a certain tendency to look like a piece of patchwork, but withal a very frank and admirable attempt at the setting forth of a series of problems of enduring interest.

JELLIFFE

PROBLEME DER MYSTIK UND IHRER SYMBOLIK. By Herbert Silberer. Hugo Heller & Co., Vienna and Leipzig.

In this very fascinating volume Dr. Silberer has set himself a very important task. That "there is nothing new under the sun" is as true to-day as when it was written by Solomon, but nevertheless each century, each generation in fact, phrases the old truths in new forms, if not better ones. Language has already amply crystallized those old and enduring truths founded upon what we are in the habit of calling natural law, but for the more modern aspects of science, modifications of the scientific symbols have been rapid and varied from age to age. In the book before us the author has set himself the task of tracing some of these. He thus attempts to outline the salient features of the hermetic art, of the beliefs of the Rosicrucians, of freemasonry and of alchemy. He shows how one form of utterance gradually modified into a later one, and still further elucidates their relationship to that which has given rise to mysticism in all ages. Most interesting of all, however, is the illumination cast upon all of the various aspects by the psychoanalytic hypotheses.

The book is divided into three parts: an Introduction, an Analytic and a Synthetic part. In the Introduction the author reproduces an old book or pamphlet entitled "The Parabola." This is an anonymous work written in the sixteenth century. It concerns the philosopher's stone and is ostensibly a Rosicrucian production. It tells of the wanderings of a pilgrim, introducing, somewhat in the general character of the Pilgrim's Progress, various symbolic situations. Following this the author gives a short and very lucid chapter on the interpretation of dreams and the significance of myths, and then plunges into the analytic portion of the book. Herein he analyzes in great detail the various features of the hermetic art, the teachings of the Rosicrucians, the Freemasons, the Alchemists, and the Mystics of this century. His is no superficial interpretation that regards the cultural movements of these times as various forms of charlatanism, but a comprehensive and sympathetic insight into the science of the times as exemplified in these various teachings.

Silberer attempts to show the religious and symbolic striving of the age in its higher or mystical sense, and amply demonstrates that these various forms of belief in the various ages represent the highest strivings of the human mind.

The whole book is a very valuable contribution to the problem of symbolism, its various transformations and modifications, and an especially penetrating study of the culture of the middle ages.

JELLIFFE

AN ATLAS OF THE DIFFERENTIAL DIAGNOSIS OF THE DISEASES OF THE NERVOUS SYSTEM. Analytical and Semeiological Charts. By Henry Hun, M.D., Professor of the Diseases of the Nervous System in the Albany Medical College. Southworth Co., Troy, N. Y.

This work of Dr. Hun's is in many respects unique. Not since the days of Linnæus and his contemporaries, especially Sauvages, Plocquet, Valenzi and Vogel has the method of approach as outlined in this work been so extensively utilized. It is highly probable that it is because of Dr. Hun's early interest in botanical nomenclature that this method, which was utilized in the latter part of the eighteenth century, has been put forth. It was good then, why should it not be of service at the present time? Dr. Hun has answered the question in the affirmative, for he has

made a highly valuable contribution to the systematization of neurological facts. Diagnosis of diseases of the nervous system, as he well says in his introduction, is acknowledged to be one of the most difficult subjects in the course of the practice of medicine. The nervous system is well recognized to be the most complex of all systems, inasmuch as it coordinates and interrelates all of the organs of the body. It therefore has the most marked extension as well as the most varied functions. It is a counterpart of the whole body.

Any attempt therefore to formulate it in clear, concise and usable schemes should be welcomed. The disadvantages of didacticism resident in such schemes are negligible in view of the surety for the main facts. Dr. Hun has therefore constructed a work of some 290 quarto pages arranged in the form of charts and tables. In the introductory charts, methods of examination are taken up. He derives his data from questioning, inspection, palpation, percussion, electricity, lumbar and brain puncture, ophthalmoscopy, laryngoscopy and thermometry. He then presents a comprehensive table of the analysis of the subjective symptoms of the case, and then discusses the analysis of the objective symptoms of the case. Following this definite disorders, such as those of consciousness, of memory, of the emotions, of motor activity, spasms, ataxia, tremor, reflexes, sensation are charted. Under electrical examination he gives a comprehensive survey of the main facts to be ascertained, with reproductions of Erb's points, and also a rough and ready grouping of the chief facts concerning the cerebrospinal fluid and its examination. In chart 9 certain of the chief syndromes are taken up. This comprises the first part of the book.

In the second part, differential diagnosis is discussed, in which clinical diagnostic analyses of the symptoms, attained from the examination of patients, are set forth in tabular form, using the familiar analytic methods of botanical and zoological manuals for their demonstration. Thus the principle of dichotomy is utilized throughout. Such a principle in medicine is of course fraught with a certain amount of danger, but Dr. Hun has cleverly obviated most of the defects by copious cross references, and has made an attempt to include most of the exceptions. Naturally he must assume that a disease so called has something static, crystallized, as it were, somewhat like a recognized species of plant or animal, and in the more stabilized reactions of the nervous system to accident, injury or other destructive processes, such a concept undoubtedly, if not valid, is at any rate useful. In the more fluid and plastic conceptions such as reign in mental activities the defects of such a scheme appear just as the defects in the earlier schemes of Vogel, Plocquet and Sauvages are manifest to us at the present time, and just as the modern botanist must reject the Linnæan schemes of classification. The student of comparative nosology, as well as of systematic botany recognizes that the apparently clear formulæ of one century have very little application for those of another, and that even within the course of a generation vast and important rearrangements of facts take place which entirely destroy the value of previous generalizations. The student, however, is not primarily concerned with these fluctuations and modifications any more than the prattling child cares to be involved in the disputations of the philologists, so that the objections that may be resident in the general scheme as put forth in the diagnostic tables in the work under consideration are practically not valid for the student's purposes, so long as the student recognizes that Dr. Hun has arbitrarily assumed a condition of affairs for a certain definite time and

that his analyses apply to that stable group of facts seen from this point of view, we know of no work that will bring about more expeditiously the things striven for, namely, a rough and quick mode of establishing diagnostic criteria.

We congratulate Dr. Hun on having brought to a successful completion an idea which has no doubt been developing in his mind for a great many years.

JELLIFFE.

Notes and News.

POST-GRADUATE COURSE AT THE PSYCHIATRIC CLINIC OF MUNICH 1915.

From Monday, February 15, to Saturday, March 6, 1915, a post-graduate course will be held at the psychiatric clinic of Munich. The following lectures will be given:

ALLERS: "Chemical Pathology and Dietic Treatment of the Psychoses."

BRODMANN-TÜBINGEN: "Topographical Histology of the Cortex."

ISSERLIN: (1) "Experimental Psychology," (2) "Psychotherapy."

KRAEPELIN: "Psychiatric Clinic."

PLAUT: "Examination of the Cerebrospinal Liquor and of the Serum."

RÜDIN: (1) "Demonstrations on Forensic Psychiatry and Juvenile Criminality," (2) "On Degeneracy and Heredity of Mental Diseases."

SPIELMEYER: (1) "The Anatomical Bases of Mental Disease," (2) "On Aphasic, Agnostic and Apratic Disturbances."

TRÜNDELENBURG-INNSBRUCK: "Physiology of the brain."

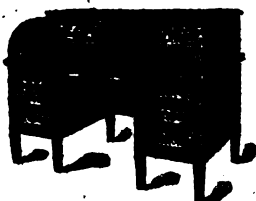
Number of the hours, 100. Fee, M. 63. The exact program is to be published later. Apply to M. Privatdozent Dr. E. Rüdin, Oberarzt, Nussbaumstrasse 7, Munich.

Obituary: Dr. A. S. Levery, of New York, instructor in neurology at Cornell University, died in August, 1914.

T. G. SELLEW

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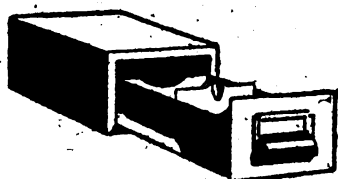
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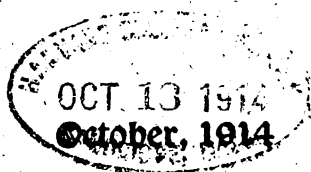
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No. 10

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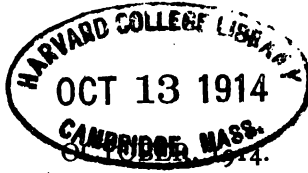
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Original Articles

THE ASSOCIATION OF VARIOUS HYPERKINETIC SYMPTOMS WITH PARTIAL LESIONS OF THE OPTIC THALAMUS.¹

By E. E. SOUTHARD, M.D.

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DIRECTOR OF THE PSYCHOPATHIC HOSPITAL, BOSTON**

ABSTRACT

- I. GENERAL CONSIDERATIONS.
Diagram of the neurone supply of the optic thalamus.
Motor disorder the most frequent effect of optic thalamus lesions,
except those extensive enough to produce hemianesthesia.
Hyperkinesis and neural tissue-simplification.
A possible structural correlate of depression.
- II. MATERIAL OF THE STUDY, WITH BRIEF REMARKS UPON THE THALAMUS.
Cases of totally destructive or focally destructive lesions omitted
from consideration.
Endeavor to study cases of diffuse chronic conditions of partial loss
or absence of mechanisms (atrophy, aplasia) such that the through-
routes for sensory impulses are preserved.
Impossibility at present of imitating such lesions by experimental
methods such as extirpation by scalpel or by electrolysis.
Summary of structures whose lesions were reviewed.
Summary of symptoms reviewed.
- III. HYPERKINESIS AND DIFFUSE CHRONIC THALAMIC LESIONS.
Hyperkinetic symptoms are here defined as including psychomotor
excitement, violence, destructiveness, homicidal acts, irritability and
exaltation.

¹ Read in abstract at the Albany meeting of the American Neurological Association, 1914. Being Contributions of the Danvers State Hospital No. 52 and of the State Board of Insanity, Massachusetts, No. 31 (1914, 11). (*Bibliographical note.*—The previous contribution was by E. E. Southard, entitled: "Conclusions from work on the Epidemic of Paratyphoid Fever. Boston State Hospital, 1910," Boston Medical and Surgical Journal (in press).) The statistical basis for the work was laid in part by Dr. (then Mr.) Alexander Forbes, Student in Neuropathology, Harvard Medical School, working as Interne at Danvers State Hospital, 1910.

24 of 29 cases showed one or more of these hyperkinetic symptoms. Study of the exceptions shows that two cases had also lesions of the thalamocortical neurone systems, that one case was an instance of pulvinar lesions, and that one was a case with lesions hardly extensive enough ("vacuoles") to be included.

But one case out of the remaining 25 failed to show such symptoms (a stuporous general paretic).

Comparison of this group with a group of 261 cases with normal-looking brains shows that the thalamic series excels the normal-looking brain series in *violence, homicide, and irritability*.

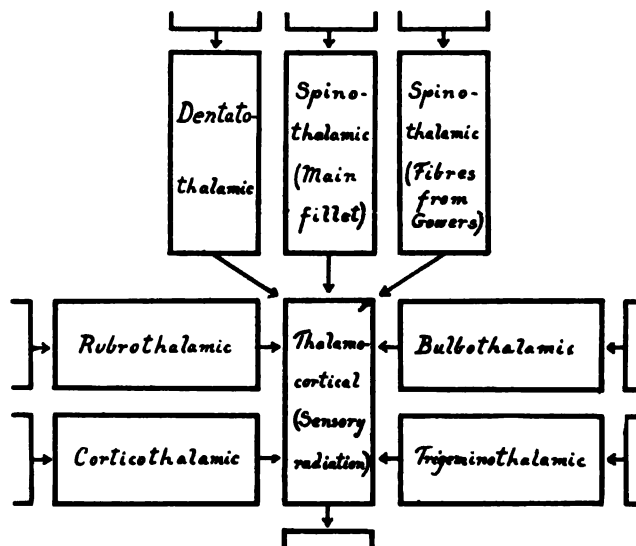
On the other hand the thalamic series showed fewer depressive symptoms (including suicidal tendencies and apprehensiveness) than the normal-looking brain series.

IV. GENERAL RESULTS.

I. GENERAL CONSIDERATIONS

The considerations of the present paper will stand out more clearly if I present in simplified form a diagram of the connections of the thalamus which has served me in elementary teaching. The following is a diagram of the

NEURONE SUPPLY OF OPTIC THALAMUS



As to the construction of the diagram, let me merely say at this time that it is one of a series constructed by Dr. Samuel T.

Orton and myself for the purposes of elementary teaching in the course in neuropathology in the Harvard Medical School.¹ One of the advantages of the diagram system may perhaps be illustrated by the considerations of the present paper. If the general conclusions be erroneous, or are founded upon an erroneous conception of the neurone supply of the optic thalamus, the work will stand convicted all the more readily on account of the very nature of the diagram.

Briefly put, the conclusions of the present paper are: that if the (*a*) spinothalamic or fillet fibers, and the (*b*) thalamocortical or sensory radiation fibers are intact, and along with them the (*c*) spinothalamic fibers from Gowers's tract and the (*d*) trigeminothalamic and (*e*) bulbothalamic analogues of the fillet fibers be intact, then we must regard the functional result of an atrophic process or an aplasia of the thalamus as due in all probability to a deficiency either in various internal mechanisms of the (*f*) shunt cell order, or to a deficiency in the supply of cerebellar neurones; that is to say, immediately in a deficiency in the supply of (*g*) dentatothalamic or (*h*) rubrothalamic neurones, or finally in a deficiency of the (*i*) corticothalamic neurones. It is plain that the long sentence in which these simple pathological hypotheses have just been expressed cannot be readily assimilated by the average mind at a single reading. It is, however, a fact that each of the neuronic elements mentioned therein except the shunt cells appears in the diagram inserted above. In passing, therefore, I call attention to the value of such diagrammatic methods of exposition of these complex looking but really simple statements. I will not pause to consider in detail the advantage which the above simple rectangles have over the neurone silhouettes which have come into general use in text-books: they are, as Dr. Orton and I have found by experience, far easier to remember.

Concerning the theoretical question whether the simplification of thalamic mechanisms, which probably lies at the basis of the mania and other hyperkinetic symptoms which I find in a high degree of correlation with atrophy and aplasia of the thalamus, is due to a deficiency in cerebellar or in retrograde cortical impulses, I would say that very probably the latter are on theoretical grounds the more important impulses. Still, it might well be that histological research should in future prove that in various

cases the cerebellar neurones are those which in certain cases suffer most. I leave this question open.

Nothing is clearer than that the optic thalamus needs eager study by the neuropathologist. Before we advance too far into the forest of the cerebral cortex, we need to examine the less tangled shrubbery of regions like the nuclei of Goll and Burdach and the optic thalamus, through which so many important sensory impulses pass on their way to the cortex. For, though it is plain that all sorts of transformations may occur in various parts of the cortical jungle, leading to a gamut of morbid functions illustrating every trilogy ever conceived by Wernicke,² yet it is equally plain that such a triad as Wernicke's *anesthesia*, *hyperesthesia*, *paresthesia*, may well be founded on morbid conditions in spinal or other subcortical grey matter, conditions such that, no matter how normal the cortex, disorder of sensation must inevitably occur and remain refractory to every neutralizing effort. It is not so obvious, though perhaps equally true, that Wernicke's triad of motor disorders, *akinesis*, *hyperkinesis*, *parakinesis*, might also be dependent on subcortical disorder and moreover on subcortical disorder in the sensory, afferent, or intaking mechanism. Indeed, I must point out that hyperkinetic or parakinetic phenomena, such as hemichorea, and hemiathetosis, have long been associated with lesions of this intaking mechanism, the optic thalamus and that a phenomenon of akinesis (the failure to innervate one side of the face for the emotional purposes of laughing or crying) has also been found to occur with certain thalamic lesions.³ And the present note will convey an allied fact, namely, that certain types of lesion so simplify the optic thalamus that a more generalized form of hyperkinesis, a form perhaps better expressed in the psychiatric term mania, is practically certain to occur.

Before saying a few words about mania, let me return to the optic thalamus. While planning more elaborate anatomical and histological studies of the optic thalamus in psychopathic subjects, I determined to undertake a brief statistical investigation of such thalamus material as the Danvers laboratory afforded, in order to choose the best lines for more particular attack. I was startled to find, upon executing a number of symptomatic correlations in the Danvers material, that the cases of diffuse chronic and (as it were) finished or extinct lesions in the

thalamus were uncommonly apt to be maniacal cases, or, if not in a narrow sense maniacal, in a broader sense hyperkinetic. That is, though I did not find characteristic choreas or athetoses (such as occur in various global destructive cases of thalamus lesion), I did find symptoms of the kinetic group to which these more familiar thalamic symptoms belong. I did not find anesthesia, nor is there any evidence that the cases were hyperesthetic, at any rate hyperesthetic in a "conscious" sense. Naturally the hypothesis occurred to me at once that the hyperkinesis might be in some sense a response to the cortical arrival of impulses passed through a simplified thalamus.

At this point I was reminded of some older work upon epilepsy, in which I suggested how favorable to the march of convulsions was the simplification of cortical tissues found in various cases of organic epilepsy. The tissues were then reduced to conditions not much more complex than those which prevail, say, in the spinal cord. Impulses, once engaged in the neurones of such a "spinalized" cortex, ran off with the speed and inevitability of spinal impulses, when upper inhibitors are all cut off. A kind of hyperkinesis, namely, the epileptic attack, ensues.⁴

In some such way I conceived that the simplification of the thalamus in chronic lesions might work. As bearing on the general mania question or the still more general hyperkinesis question, I therefore determined to bring forward the statistical fragments of the present paper.

Let me hasten to add what is perhaps unnecessary, namely, that no one should charge me with thinking or hinting that all, or any large portion of, cases of mania will be found to have oversimple thalami. I assume that it is, or will be some day, sufficiently proved that a nervous system which is intrinsically quite normal may yet become extrinsically or pragmatically abnormal, and, for example, purvey a mania under the influence of substances or conditions hitherto undiscovered in blood serum or lymph. What I should wish to be understood as maintaining, however, is that perhaps some cases of mania are of thalamic origin and that these cases suggest a possibility of producing hyperkinesis by lesions, not on the kinetic, but on the sensory or afferent side of the apparatus. Under such circumstances the *immediately* kinetic neurones are by hypothesis intrinsically

normal, whereas extrinsically they purvey what is, for the whole organism, abnormal, namely, over-activity.

This concept of structures which remain intrinsically normal while extrinsically abnormal has been developed somewhat more in extenso elsewhere,^{5, 6} and I do not wish to emphasize it here except to escape the elementary accusation that, if I describe a structurally simplified thalamus as permitting or producing mania, I seem to be laying down a general principle for the production of mania. Suppose my findings be confirmed and it be discovered that the thalamus is both extrinsically and intrinsically abnormal in some cases and these cases prove maniacal, the whole observation remains within comparatively narrow limits. It is only when the principle of thalamic simplification is generalized to exemplify neural simplification elsewhere that a valuable generalization for the structural basis of hyperkinesis can be obtained.

Thus, it is conceivable that somebody will show that simplifications (atrophies, aplasias, agenesis) of the spinal and bulbar grey matter can be correlated with hyperkinesis. Again, somebody may prove that cortical simplifications, either on the impulsive or on the expressive side of the apparatus, are correlated with hyperkinesis. The fact would probably remain that an entirely normal nervous system—i. e., *intrinsically normal*—would also permit hyperkinesis under various chemical, physical, or other conditions. It is clear that the validity of the thalamic correlation is injured, but not annihilated, by the existence of any number of non-thalamic correlations, no more than the correlation between global total destruction of the thalamus and hemianesthesia is destroyed by the existence of spinal, capsular, or hysterical hemianesthesia in which the thalamus possibly remains quite normal.

I should not draw out this argument *ad nauseam*, had I not found various psychiatrists ready to oppose my various structural correlations in dementia præcox by citing cases in which those particular correlations had not been observed.⁷ Thus, the favorite claim of various modern psychopathologists, that dementia præcox is psychogenic or in some sense non-structural, may be restated in this form: the nervous system is intrinsically normal, but extrinsically abnormal. Of course my observations lead me to think that this is not actually the case in dementia præcox and that in point of fact *intrinsic* abnormalities in nerve

structures are constant features of dementia præcox. Be that as it may, one may admit readily enough that the phenomena of dementia præcox *might* be produced despite an intrinsically quite normal nervous system. The dementia præcox question is a question of fact, not of logic.

So with mania or hyperkinesis and its correlation with nerve tissue simplification. Thalamic simplification is but one example of tissue simplification, and that probably numerically not greatly imposing. But the correlation has suggestive value. In point of fact most manias will fail to show thalamic lesions, and it is a question how many will show any actual tissue-simplification. You may hasten an object down a path by smoothing the path or by smoothing the object or by pushing the object with more force at the outset. Our thalamic disease smooths the path.

Perhaps a word should be said concerning the possible basis of the somewhat opposite kind of thing which we call depression. It is of course clear that, if mania is in some sense truly (though but partially) equivalent to hyperkinesis, depression is far less truly an equivalent of akinesis. It is nevertheless true that inhibition of movements and retardations of movement do characterize various depressions. It might be inquired whether some thalamic condition would not account for some cases or kinds of depression. And the emotionality and spells of depression in victims of apoplexy might possibly be thought somehow related with collateral conditions in the thalamus, the result of pressure transmitted from the capsular lesion producing the actual apoplexy.

The only point I can at present offer on the structural side of depression is derived from some work done with Dr. Earl D. Bond on various cases of mental disease arising between the tenth and twentieth years.⁸ The depressive cases of that (all too small) group of cases were found to show no convincing evidence of nerve tissue loss (in the sense of cell-destruction); but they did show the nerve cells of numerous types filled with certain lipid substances which Bond and I interpreted as metabolic or catabolic products not properly swept out of those cells. It was, I believe, an idea of Bevan Lewis⁹ that in the nerve cells of maniacal subjects he could not find even the normal amount of pigment.⁸ I have also some fragmentary evidence in the same direction (see especially case 14 in a former study.)¹⁰ The opposite condition,

or what might be termed catabolic clogging of cells, may finally be proved to characterize depression.

Enough has been said to indicate a possible attack upon structural lines on the general problems of mania and depression. In such an attack it should be remembered that both symptoms are probably quite consistent with the preservation of the life of every neurone in the nervous system. From the nature of the case, however, it is a little more likely that you shall find the habitual maniac to have lost some of his cells, or more fancifully expressed, to have smoothed some of his paths, than that you shall find the habitual depressive a victim of cell-loss, perhaps the habitual depressive will be found more a victim of cell-clogging than of cell-loss.

II. MATERIAL OF THE PRESENT STUDY WITH BRIEF REMARKS UPON THE THALAMUS

The tenor of Section I might indicate that the present study was begun with the object of learning something about mania. In point of fact the study began with another *à priori* consideration, viz., the desirability of learning something about the optic thalamus in its possible relation to mental symptoms. Former work on dementia præcox had suggested that certain parakinetic phenomena (catatonic states, etc.) might possibly be related more with the sensory areas of the cerebral cortex than with the motor.¹¹ A natural step was to inquire whether lesions of subcortical structures might not occasionally produce such symptoms. A statistical study was therefore undertaken by Dr. (then Mr.) Alexander Forbes in the summer of 1910 to see whether any valuable correlations could be obtained between mental symptoms and optic thalamus lesions. Success did not then reward his efforts or my own in collaboration with him; and it is only in the early portion of 1914 that I have been able to con over the statistical tables of 1910 and, by (a) restricting the inquiry to long-standing and inactive lesions and (b) grouping certain symptoms as hyperkinetic, to secure a likely correlation.

As stated above, the optic thalamus, both of man and of the higher animals, richly deserves the attention of the neuropathologist. Especially have the nature and effects of diffuse chronic lesions been neglected. There is, to be sure, a slowly

increasing literature concerning the relations of the thalamus to anesthesia and to chorea, as well as to various aspects of emotion. On the human side, those cases have been most studied which have yielded at autopsy more or less clean-cut unilateral lesions entailing global destruction either of the entire thalamus or of some definite portion of it. Experimentally also, global entire or partial destructive lesions have been studied, of late years also with the Clarke-Horsley stereotaxic machine. The anatomists, too, have made progress with the thalamus, subdividing it more and more carefully into constituent nuclei and fiber-tracts, as well as unravelling various relations with the hypothalamus, the red nucleus, the cerebellum, and the like.

But the cysts of softening and focal hemorrhages which interest the clinical analyst and the mechanical or electrolytic extirpations which the physiologist produces are far from imitating successfully those finer diffuse atrophic lesions, apasias, or agenesias, of certain selected elements, which form the particular stock-in-trade of the modern neuropathologist. This is not a place to develop the conception; but it is safe to say that the whole doctrine of "irritative" lesions of the nervous system remains much in the condition in which Hughlings-Jackson left it—namely, as a narrow and insecure extension of those principles of extirpation-neurology which had done such yeoman service in uncovering the principles of "destructive" and "paralytic" phenomena. The neurologist who is interested in "irritative" or "discharging" lesions must often remain content with "pressure," "collateral edema," "chemical changes in nerve-elements," and the like, to explain irritative phenomena; remain content, in short, with restatements of what is happening. While seeming to be a structuralist (since he seems to attribute by-effects to certain structural lesions), the neurologist really goes over bag and baggage to the broad and easy paths of the functionalist, attributing any event to ill-defined chemical or physical changes, acquired habits of neurones, etc.

The time has come, however, to overhaul the data of selective lesions and to contrast these with global lesions. A global lesion (such as a cyst of softening) of the entire optic thalamus must entail the death of the fillet-terminals and of the origins of the thalamocortical neurones. This lesion must entail, according to modern views, corporeal and facial hemianesthesia, both for

skin-sense and for muscle-sense. If not, then modern views may perhaps be to some extent wrong in assigning to the thalamus the function of arrival-platform for all the terminals of the main fillet; possibly some of the skin and muscle sensory impulses rise to the cerebral cortex by some other route. However, global and entire lesions of the thalamus are singularly rare, and especially rare are such as permit the victim to survive long enough to get over the by-effects of "shock," "pressure," "diaschisis," etc. Acute lesions that look global may not be global; especially true is it that infiltrative tumors that look to be extensively and entirely destructive of a given mass of tissue really permit vast numbers of intact neurones to thread their way through to their normal termini.

Hence, various "well-observed but entirely negative" cases. Cases looking alike show, some of them, hemianesthesia, some of them no hemianesthesia. Or, again, lesions looking alike are in one case correlated with hemianesthesia, in another case with hemichorea, in another with no symptoms whatever.

The impression afforded by a study of thalamic literature is that—(1) lesions destructive of fillet or thalamo-cortical neurones or their intervening synaptic connections do entail lasting hemianesthesia, and that (2) other lesions, such as leave fillet and thalamocortical neurones relatively intact, are *somewhat likely* to produce (a) certain "irritative"-looking symptoms, such as hemichorea or hemiathetosis and (b) certain "destructive"-looking symptoms, such as incapacity to innervate one side of the face in the expression of emotion (as laughing and crying). There are also a few studies indicative of vasomotor and nutritive disorders following thalamic lesions.

The point of view here adopted is a different one. I have here endeavored to secure a fair sample of diffuse chronic lesions of the thalamus, disengaging these from focal and acute lesions and examining their symptomatic results so far as possible separately from the results of transient apoplectic symptoms, diaschisis, shock, and the like, as well as from the results of permanent destruction of the fillet-terminals or the thalamo-cortical neurone origins. I raise the question, What is the effect of simplifying the thalamus, in such wise as to preserve what we regard as its main function (that of way-station for certain afferent-impulses)? The result is a group of cases which do not

exhibit hemianesthesia. Nor do they exhibit chorea or athetosis. Interestingly enough, however (to anticipate above) they do show a surprising correlation with other more generalized forms of hyperkinesis. Simplification of the thalamus, such as follows diffuse chronic lesions, entails (if my statistics can be trusted) a certain hyperkinetic or maniacal tendency in the subjects of such disease, supposing all the while that the main sensori-transmissive function of the thalamus is preserved. It is an interesting inquiry whether this hyperkinetic tendency depends on a species of hyperesthesia, whether, that is to say, the simplified thalamus is an organ that is letting impulses through undampened by the former and normal supply of collateral impulses from the red nucleus, the cerebellum, or elsewhere. Upon this hypothesis perfectly normal impulses coursing through the fillet neurones and running unmodified in amount and rate into the thalamo-cortical neurones might arrive at the cerebral cortex with unusual excitatory powers.

Be all that as it may, the statistical correlation between diffuse chronic thalamic lesions and hyperkinetic states in psychopathic subjects is sufficiently striking to be recorded.

Search was made in the protocols of the Danvers State Hospital laboratory for cases of lesion, acute, chronic, or of unknown duration (tumors) involving the optic thalamus or adjacent structures. All these cases, together and in various groups, were studied from the clinical standpoint (cross-index of symptoms). Various correlations were tried, and the above-mentioned correlation with various hyperkinetic symptoms proved to be the only very high correlation.

The anatomical analysis included the so-called "basal ganglia," described variously by various authors (the term should perhaps be given up). By Schäfer and Symington¹² they are described as related to the cerebrum which "contains various masses of grey matter situated more deeply and closely related to its peduncles, such as the corpora striata, thalami, etc., . . . known collectively as the basal ganglia of the cerebrum." When anatomists come to a more minute consideration of these basal structures, they however consider the optic thalami apart from the other "basal ganglia," and place them in the interbrain, diencephalon, or thalamencephalon.

The interbrain is commonly accounted to contain: optic thal-

ami, pineal gland, ganglion habenulæ, tænia thalami, tubera cinerea, corpora mammillaria, optic chiasm, optic tracts.

We have excluded from analysis all these basal structures except the optic thalami, although it might have been possible to include a number of pineal gland cases (these have been reserved for separate study).

The cerebral ganglia comprise: Caudate nucleus, lenticular nucleus (corpus striatum),* amygdala,† claustrum.†

Lesions involving any of these structures are likely also to involve: internal capsule, external capsule, fornix, stria terminalis, septum pellucidum, corpus callosum.

But, of the ten structures just enumerated, the lesion catalogue showed entries under but six (although the others were involved in various cases).

The cases studied therefore embraced, besides those above mentioned, cases of lesion of corpus callosum, caudate nucleus, lenticular nucleus, external capsule, claustrum, internal capsule, here arranged in the order adopted by Schäfer and Symington, and described by them, with the ventricles and a few other structures, as forming the "central parts and base of the cerebrum."

In addition to cases having lesions in the six structures just enumerated, we have studied cases with optic thalamus lesions. The card-catalogue entries were accordingly: optic thalamus, caudate nucleus, lenticular nucleus (corpora striata), corpus callosum (basal ganglia), external capsule, claustrum, internal capsule, i. e., nine entries, requiring in several instances special study to determine just what was meant by "corpora striata" and "basal ganglia" respectively.

The optic thalamus is described as having four surfaces (superior, inferior, external, and internal) and two extremities (a narrow anterior and a broad posterior extremity).

The superior surface is marked by an oblique groove running outwards and backwards. Externally and anteriorly to this groove, the superior surface forms part of the lateral ventricular floor; internally and posteriorly to the groove, the superior surface is covered in by pia mater. The ventricular part of the su-

* v. Monakow identifies the corpus striatum with the caudate nucleus.

† v. Monakow regards the nucleus amygdalæ as certainly to be reckoned with the cerebral ganglia, but expresses doubt as to the claustrum, which is according to Cajal a separated portion of the lenticular nucleus, but according to Meynert is a separated portion of the insular grey matter.

perior surface is dominated by the so-called anterior tubercle of the thalamus; the more posterior part covers the pulvinar.

The inferior or ventral surface of the thalamus is continuous with a prolongation of the tegmental part of the peduncles and the (hypothalamus) and with the tissues of the corpora mammillaria and tubera cinerea.

The external or lateral surface of the thalamus is in contact with the internal capsule.

The interior or mesial surface forms a portion of the surface of the third ventricle; from it springs the so-called middle commissure or massa intermedia to join with its fellow on the other side.

The hypothalamus just mentioned as continuous with thalamic tissues lies under the more posterior portion of the thalamus. That portion of the hypothalamus nearest the thalamus is, following Forel's nomenclature, the stratum dorsale, containing fibers that either go into the dorsal longitudinal bundle (Meynert) or into the red nucleus region (Forel). Schäfer and Symington state that fibers from the red nucleus stream into the internal medullary lamina of the thalamus (as well as also to the lenticular nucleus). Other fibers from the upper fillet (Wernicke) are stated to run into the external medullary lamina of the thalamus, where it is contact with the internal capsule. Another bundle of fibers is thought to run from the mesial part of the thalamus backwards through the hypothalamus into the dorsal part of the posterior commissure, and over the Sylvian aqueduct into the opposite tegmentum.

The thalamus is stated to receive fibers from:

1. Nuclei of Goll and Burdach (fibers running as internal arcuate fibers, decussating in raphe, to form the main fillet or lemniscus).

2. Sensory nuclei of cerebral nerves (fibers in part running in the main fillet).

3. Sensory nuclei of cerebral nerves (fibers running in a separate tract, "central tract of the cerebral nerves," adjacent to main fillet).

Sensory nucleus of fifth nerve (fibers forming "central tract of trigeminal").

5. A portion of Gowers' tract of spinal cord (to lateral portion of thalamus).

6. Superior cerebellar peduncle (sending also collaterals to red nucleus).

7. "Most parts of the cerebral cortex."

8. Red nucleus (to internal medullary lamina).

The thalamus is stated to distribute fibers to (1) "most parts of the cerebral cortex," (2) corpora striata, (3) internal capsule, (4) posterior commissure and opposite tegmentum.

From the symptom-index, practically all symptoms were considered which might have even a remote bearing on the cases. The following two groups were more or less arbitrarily chosen for special consideration: (a) amnesia, confusion, delusion, dementia, disorientation, incoherence, incoördination, judgment-defect, stupor, and (b) apathy (indifference), depression (hypochondria), destructiveness, exaltation (euphoria), homicidal acts and threats, hyperreligiosity, irritability, psycho-motor excitement, resistiveness, sexual symptoms, suicidal acts and threats, violence. The main principle of this grouping was an endeavor to get emotional or probably-emotional symptoms out into a separate group (b). As the sequel showed, the correlation was not with either group, but with that might be termed a *hyperkinetic group*, obtained by throwing together the following symptoms,—destructiveness, exaltation, homicidal acts and threats, irritability, psycho-motor excitement and violence.

Correlation was also attempted between this hyperkinetic group of symptoms and cases with non-thalamic lesions of the basal group. Also, between other symptoms and symptom-groups and cases with thalamic lesions. All these correlations were too low to be suggestive. I omit details of these comparisons.

In 1,000 autopsies, there were 40 cases showing thalamic lesions, on left side in 13, right in 13, in 14 bilateral. 23 cases are described as having totally destructive lesions, leaving 18 with partially destructive lesions. Lesions more *anterior* are described in 5 cases (1, 116, 501, 810 (also lateral), 1,107). More posterior, 2 cases (425, 496 (a bilateral case)). Middle anterior lesions in 3 cases (666, 785, 915). Superficial atrophy is described in two bilateral cases (933, 938) and also in one included as anterior (above case, 1,107).

Acute lesions were found in 5 cases, four hemorrhagic, one necrotic (result of thrombosis, case 1). The hemorrhagic cases were 259, 574, 785 (bilateral) and 817.

III. HYPERKINESIS AND DIFFUSE CHRONIC THALAMIC LESIONS

Excluding as acute 5 cases (1, 259, 574, 785, 817); as unknown whether acute or chronic (*in re* optic thalamus) a tumor cases (302, 1,136); as subject to superficial pitting or atrophy 4 cases (64, 933, 938, 1,107), we arrive at 29 cases of more or less extensive chronic lesion of one or both thalami.

Out of numerous attempted correlations between the lesions and the clinical symptoms shown, none is more striking than that with mania. If we count as *maniacal* the following symptoms: psychomotor excitement, violence, destructiveness, homicidal acts and threats, irritability, exaltation, we shall find that all but 5 of 29 cases with long-standing partially destructive focal or diffuse lesions of one or both thalami exhibited from one to several of the above-mentioned maniacal symptoms, whereas at the same time depressive symptoms are largely absent (v. below).

These showed hyperkinetic symptoms as follows:

No.	Psychomotor Excitement.	Violence.	Destructiveness.	Homicidal Acts.	Irritability.	Exaltation.
116	X	..	..	..	X	..
140	..	X	..	..	X	..
189	no maniacal symptoms			..	..	I
389	..	..	..	..	..	X
415	X	..	..	..	..	..
423	X	..	X	X	..	..
425	X	X	..	..	X	..
428	..	..	..	..	..	X
433	..	X	..	..	..	..
443	..	X	..	X	..	..
480	X	..	..	..	X	..
488	X	X	..	X	..	..
493	X	..	..	..	..	..
495	no maniacal symptoms			..	..	..
496	..	X	..	X	X	..
501	X	X	..	..	..	X
529	no maniacal symptoms			..	..	..
539	..	..	..	..	..	..
546	..	..	..	..	..	..
552	X	..	..	..	..	..
562	..	X	X	X	X	..
586	no maniacal symptoms			..	..	..
666	..	X	..	..	..	..
804	no maniacal symptoms			..	..	..
810	..	X	..	..	..	..
915	..	X	..	..	..	..
941	..	..	X	..	..	..
1,177	X	..	..	..	..	..
1,210	X	..	..	X	X	..

The exceptions to this curious rule are as follows:

Case 586 was one of total or almost total destruction of the right thalamus, but complicated by a similar destruction of the upper quarter of the right post-central convolution, as well as extensive destruction of the right temporal and occipital tissue and of the left lateral lobe of the cerebellum. It is improbable that we have here to do with an "irritative" thalamic lesion in the sense of a lesion destroying some elements but permitting numerous impulses to go through: This case is the purest example in the series of a really destructive thalamic lesion. 586, accordingly, does not appear to be a genuine exception to this group, but rather an example of a different species of condition.

Case 529 was a case of senile dementia in which, on the right side, there was a reduction in the size of the pulvinar region, a region probably not closely related to the fillet system, but more to the visual paths. There is no record, to be sure, of any visual effect wrought by this lesion: but perhaps this could hardly be expected in such a dement.

Case 804 showed a small cyst of softening in the anterior nucleus of the left thalamus; but the thalamocortical system of fibers appears to have been also destroyed or greatly interfered with, so that it is improbable that thalamic impulses were reaching the cerebral cortex in their normal amount, regardless of any destructive or irritative conditions in the thalamus itself.

Case 495 was a case of general paresis, demented form, which ought to have shown maniacal symptoms if it were to fall in with the above group. The case was a stuporous one during hospital stay.

Case 189 was a case of senile dementia, which showed so-called "vacuoles" (dilated perivascular spaces?) in the right thalamus as also in the right lenticular nucleus. It is a question whether this lesion is extensive enough to warrant inclusion.

Some of these apparent exceptions to the clinical rule are not real exceptions. 529, a pulvinar atrophy case and 189, "vacuoles" in thalamus, are hardly to the point. The true denominator, omitting 529 and 189, consists of 27 cases. Of these 27 cases of thalamic atrophy or aplasia, all but three showed hyperkinetic symptoms.

On examining these three, however, it transpires that two of them showed the somewhat odd coincidence of lesions destroying

the *cortical* arrival platform for impulses passing through the thalamus (586 and 804). These cases cannot fairly be considered capable of purveying hyperkinetic symptoms, even if the thalamus were initiating a process under normal conditions (*outside* the thalamus) likely to produce hyperkinesis.

We are accordingly left with a group of twenty-five cases, all but one of which (495), gave evidence of some form or forms of hyperkinesis. 495 was a general paretic, stuporous throughout his hospital stay. It is clear that stupor might mask any or all forms of hyperkinesis, and it is also true that the usual anterior situation of the paretic lesions, with all its entailed injury to the executive side of the apparatus, might well interfere with hyperkinesis. In point of fact, hypokinesis and akinesis are not unfamiliar features in general paretics.

Be that as it proves, it is clear that chance could hardly select a group of 25 cases, 24 of which were hyperkinetic. It is natural to think of some actual correlation between the thalamic lesions which distinguished all these cases and the clinical phenomena common thereto.

To illustrate the difficulty of picking such a group by chance, I introduce a table showing the distribution of the same symptoms in a series of 261 cases which had normal-looking brains and probably contained no great number of unrecognized thalamic lesions.

	Psycho- motor Excite- ment.	Vio- lence.	Destruc- tiveness.	Homi- cidal Acts.	Irrita- bility.	Exalta- tion.	Total.*
25 Thalamic cases	11	11	2	6	7	2	24
261 Normal-looking brain cases	112	65	45	28	39	21	167

A study of the percentages here will show (figure omitted) that the number of cases of *psychomotor excitement* and of *exaltation* is relatively about the same in the two-series. The thalamic series excels in *violence*, *homicidal acts*, and *irritability*.

Upon comparing the brief table of depressions, etc., case by case with the table of hyperkinesis, we find:

140 depressed, irritable, violent.

480 depressed, irritable, excited.

* Total: Excluding cases counted twice or more.

493 depressed, excited.
 496 depressed, irritable, violent, homicidal.
 552 depressed, excited.
 562 apprehensive, irritable, violent, destructive, homicidal.
 586 apprehensive, no hyperkinetic symptoms (v. special note).
 810 apprehensive, violent.
 915 depressed, apprehensive, violent, suicidal.
 941 depressed, apprehensive, destructive.

	Depression	Suicidal Tendency..	Apprehensive- ness.	Total.*
25 Thalamic cases.....	7	11	5	10
261 Normal-looking brain cases.....	90	59	57	135

Omitting 586 from further consideration (postcentral lesions superadded to thalamic, v. above), we see that the remaining cases all showed some form of hyperkinesis and, in all but three cases, two or more forms of hyperkinesis. Depression and apprehensiveness are, as is well known, entirely consistent with various forms of overactivity, nor do "mania" and "depression," as all modern writers are inclined to admit, form incompatibles. Still there is a general tendency to incompatibility between hyperkinesis in thalamic cases and depression, since the association, either simultaneous or successive, appears in but seven cases.

The only cases of the above list of 25 thalamic cases which showed depression, suicidal tendencies, or apprehensiveness were the following 11:

	Depression.	Suicidal Tendency.	Apprehensiveness.
140	+
480	+
493	+
496	+
552	+
562	+
586	+
810	+
915	+	+	+
941	+	..	+

The percentage of depressive and allied symptoms (even granting all cases of suicidal tendency and apprehensiveness to

* Excluding cases counted twice or more.

show symptoms allied to depression) is accordingly 40 per cent. Now the percentage of cases in the "normal-looking brain series" of 261 showing the same symptoms was 52 per cent. *There is accordingly not only a far higher percentage of hyperkinetic symptoms in the thalamic series (96 per cent.) than in the normal-looking brain series (64 per cent.), but there is actually a somewhat lower percentage of depressive and analogous symptoms in the thalamic series (40 per cent.) than in the normal-looking brain series (52 per cent.).*

The following table gives the distribution of the totals:

27 CASES*			Hyperkinesis	Depression, etc.
116	L, anterior	cyst	xx	x
140	L, possibly R	softening	xx	
189	R	"vacuoles"	no symptoms	(v. text)
389	L	old hemorrhage	x	
415	L	arrested development	x	
423	L, R	small, soft	xxx	
425	R, posterior	softening	xxx	
428	L, R	small	x	
433	L	small	x	
443	L, R	atrophic	xx	
480	L, R	softening	xx	x
488	L, R	softening	xxxx	
493	R, inferior	focal softening	x	x
495	L, R	atrophic	stuporous	
496	L (pulvinar)		paretic	(v. text)
	R (central)	focal softening	xxx	x
501	R, anterior ‡	old hemorrhage and softening	xxx	
539	R	atrophic†		
546	L	softening‡		
552	L	small, atrophic?	x	x
562	L	atrophic	xxxx	x
666	R, upper, inner, midway	scar	x	
804	L	softening	thalamocortical destruction	(v. text)
810	L, anterolateral	softening and cyst	x	x
915	R, middle	focal encephalitis	x	xxx
941	L, R	atrophy, gliosis	x	xx
1177	L	softening	x	
1210	L, R	sclerosis	xxx	

IV. GENERAL RESULTS

The novel result of the present study is the correlation discovered between certain lesions of one or both optic thalami and various mental symptoms of the maniacal or hyperkinetic group.

* Omitting 529 and 586 (v. text).

† 539 visual hallucinations imagined machine side of bed. Hemiplegia, sensory disorder in legs.

‡ 546 keeps getting out of bed, motor aphasia, feebleness.

The correlation is too constant to be merely a matter of chance. It has been hitherto unobserved for several reasons. In the first place, if the statistician were to reason backwards from the clinical phenomena of mania or hyperkinesis, he would find very few cases in a large series correlated with optic thalamus disease. Secondly, the mild aplasias and atrophies of the thalami here studied are far less striking than various focal destructive lesions which would be apt to attract investigation first. But neither these focal lesions nor the various examples of thalamic tumor yield correlations of the sort here discovered. Thirdly, the whole subject of thalamic pathology has been neglected. But after all the new correlation is not so surprising, since perhaps the majority of previous correlations with thalamic disease have been with kinetic disorder and some of them with peculiar form of hyperkinetic disorder. Thalamic literature points to correlations between hemianesthesia and global destructive lesions of the optic thalamus. Aside from such cases the literature yields correlations largely on the motor rather than the sensory side. The insignificant number of correlations with vasomotor and nutritive disorder may be passed over. The kinetic disorders which we usually think of as thalamic are hemichorea and hemiathetosis, both tending to the hyperkinetic or parakinetic forms of kinetic disorder. A few cases have been described showing correlation with a form of akinesia, namely, incapacity to innervate one half the face in emotion.

The present study deals with a neglected group of thalamic lesions, diffuse chronic inactive lesions of an atrophic or aplastic nature, such that the through-routes for sensory impulses were *not* interfered with, but the neurone impoverishment must have been largely confined to the intrathalamic or other short ingoing or outgoing neurones.

Such lesions, whether unilateral or bilateral, when forward of the pulvinar, have been successfully correlated with certain symptoms of the hyperkinetic group but of a more general nature than chorea and athetosis and not tending to unilaterality. The hyperkinetic symptoms in question are destructiveness, exaltation (including maniacal elation or euphoria), homicidal acts and threats, irritability, psychomotor excitement, and violence. No claim is made that these symptoms have been adequately ana-

lyzed or that they are logically distinct. Their common feature appears to be hyperkinesis.

It is not difficult to conceive a plausible explanation of this correlation. Adequate reasons for heightened activity, responses more intense than usual, or in brief hyperkinesis (Wernicke's term) would be (a) stimuli of unusual intensity or (b) lack of the normal interference, inhibition, or damping of stimuli of usual intensity, or (c) morbid heightening of stimuli or intensification of impulses, e. g., by drugs, as they pass through their appropriate paths, or (d) new-formation under disease-conditions of stimuli of a morbid nature, intrinsically originating within neurones or at their synapses (toxic and pressure phenomena).

The hyperkinesis attending the tissue-simplification entailed by the thalamic lesions here considered, is perhaps an example of (b). Perhaps the sensory impulses coming through the fillet from the spinal cord and bulb and destined to reach a third arrival-platform in the post-Rolandic cortex are normally damped or overlaid or given escort by impulses from the red nucleus and the dentate nucleus, in such wise that without such damping or accompaniment they reach the cortex with abnormal strength, rate, or periodicity. Perhaps too the mechanism for dispersing a portion of the strength of these impulses to other parts of the cortex has become defective so that a different "cortical set" is provided under the new conditions. Perhaps again the simplification of the thalamus prevents the arrival of all those impulses from the remainder of the cortex which normally reach the thalamus. At least the known anatomical supply of the thalamus would easily permit such hypotheses. One of the readiest ways to "focalize attention," for example, would be to damp the intaking mechanism at either the first (bulbospinal gray matter) or the second (thalamic) sensory arrival platform. And the second arrival platform is anatomically well supplied with thalamocortical neurones (as Quain says, "to most paths of the cortex") and with corticothalamic neurones ("from most parts") as not greatly to strain a point if we conceive the thalamus as an appropriate seat for subcortical focalizing of attention.

We must of course remember that no true hyperesthesia is the rule with these cases, at least hyperesthesia in the conscious" sense. Yet this is perhaps true in many cases of "nerv-

ousness," "nervous irritability," "nerves on edge," and the like. It is not always that such phenomena mean true hyperesthesia: rather are they forms of hyperkinesis, of over-reaction.

So here, recurring to our figure of the object on a path, it is not that the object is projected with abnormal force or that the object is intrinsically smoother and less subject to friction; it is rather that the path itself is less capable of friction.

The concept of thalamic tissue-simplification is therefore valuable not merely as tending to explain a given instance of pathological *Bahnung* but is of still greater use when made into a more general concept. The thalamic conditions recall those of the cerebral cortex in certain cases of epilepsy where the cortical tissue was as it were "spinalized" or "automatized."

Warning should perhaps be given that few cases of mania, among all those which occur, will prove to be thalamic cases. The majority of hyperkinetic states may very probably be found to be due to other forms of *Bahnung* or still other mechanisms. Since one cannot clinically conclude a thinning of the thalamus in a case of mania, it is clear that the present communication is of general and genetic value rather than of immediate clinical value. *Verbum sap.*

To sum up, the writer has made an orientation study of the symptomatology of a group of 25 cases of chronic diffuse optic thalamus lesion and observed 96 per cent. to show one or more symptoms of the hyperkinetic group (exaltation, irritability, psychomotor excitement, homicidal tendencies, destructiveness) and but 40 per cent. to show depressive symptoms (including suicidal tendencies and apprehensiveness). To compare with these figures, the writer studied the symptomatology of 261 cases having normal or normal-looking brains and therein found only 64 per cent. showing hyperkinetic symptoms and 52 per cent. showing depressive and allied symptoms. The one exception to the thalamic correlation with hyperkinesis is hardly a fair exception, being a stuporous general paretic.

In evaluating these surprising results, it must be remembered that coarse destructive lesions, destroying through-routes for sensory impulses, have been omitted from consideration and that two additional cases of chronic diffuse lesions of the thalamus failed to yield hyperkinesis apparently because of injury to the thalamocortical system above them.

The hyperkinetic symptoms are on theoretical grounds possibly due to withdrawal of corticothalamic "inhibitory" or "switch-setting" impulses, although another way in which the thalamic mechanism could be simplified is by atrophy or aplasia of certain cerebellar connections. This question is accordingly ripe for histopathological study.¹³

The writer does not assume that hyperkinesis is always or often produced in the way indicated, but regards the work as pointing once more to the study of tissue-simplification with selective loss of neurones as contributing to the explanation of symptoms. Thus, if exaggerated knee-jerks are found correlated with simplification of spinal cord mechanisms, so more complicated forms of hyperkinesis may be found due to simplifications of more complicated structures.

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THE STUDY OF A CASE OF THE ADULT TYPE OF
POLIOMYELITIS AND OF A CASE OF ACUTE
ASCENDING PARALYSIS OF THE
TYPE OF LANDRY¹

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In reviewing the extensive literature which has accumulated in regard to Landry's paralysis, one is struck with the remarkable diversity of opinion which prevails with regard to the exact nosological classification of this symptom complex. Many authors, notably Ross, Putnam, Dejerine, Barton, Walton, Rolly, Pfeiffer, Eichhorst, Krewer, Mosuy, and Moutier, would classify all cases under the caption of acute toxic polyneuritis; whereas, Westphal, Bernhardt, Taylor and Clark, Petit, Schmaus, Löhrish, Hlawka, Pierce, McPhedran, Harbitz and Scheel, Wickman, and others believe that it is closely allied, if not identical, with the rapid adult form of poliomyelitis. V. Leyden and Goldscheider conclude from the diversity of anatomical changes, that the affection may assume a bulbar, medullary or neuritic form. While Saltman believes, on pathological grounds, that a separation can be made into a neuritic, a myelitic form, and a form without anatomical findings. In support of Saltman's contention that a form exists without anatomical findings, are the most excellently recorded cases with negative, post-mortem findings of Siefert, Hun, Ormerod, Gerandeau, and Levi, Kapper and Goebel, Rolly and Kelley.

Buzzard justly states that during the fifty years since Landry's case was published, nearly all the cases of acute ascending paralysis bearing any resemblance to its clinical features, and irrespective of their morbid changes, have been included in the category of Landry's paralysis. At the present, it is generally recognized that the irresponsible use of this name has led to such a state of confusion in the literature of the acute forms of paralysis that any effort to extricate the cases which have, from the cases which have not, deserved the term, is fruitless. This unfortunate

¹ Read at the fortieth annual meeting of the American Neurological Association, May 7, 8, 9, 1914.

confusion has resulted for the most part in three ways. (1) Many cases of acute poliomyelitis in adults have been mistaken for Landry's paralysis during life, and the diagnosis has not been revised when microscopical examination of the spinal cord has revealed the true inflammatory changes characteristic of the former disease. Acute ascending myelitis presents features, which have been responsible for the diagnosis of Landry's paralysis in certain instances. The undoubted occurrences of instances of acute, toxic polyneuritis has led some observers to believe that Landry's original case was of that nature. The absence of an examination of the peripheral nerves renders the denial or confirmation of such a possibility in Landry's case equally unjustifiable.

From a careful study of the pathological findings of the recorded cases of this disease, it does not seem justifiable to place all cases of this complex under the head of polyneuritis. Rolly, who has from the study of seven cases with three autopsies, insisted perhaps, more than anyone else on such a classification, passes his conclusions from one case, in which the intra-muscular nerves were involved, whereas, in the other two cases carefully studied, no histological changes were found. The impartial observer, in reviewing the symptoms of this particular case, would unhesitatingly place it clinically as a typical case of multiple neuritis. Pfeiffer, on the other hand, has recently studied a case of acute, ascending motor paralysis without subjective or objective sensory symptoms, in which changes in the peripheral nerves, together with changes in the pyramidal cells of the motor cortex and lateral horns of the spinal cord were found. In a case of acute, ascending paralysis of the type of Landry's reported by me in 1904, there were definite changes in the peripheral nerves and motor cells of the ventral horns of the spinal cord, and without perivascular, round-cell infiltration. In this case, no nerve or muscle tenderness, or subjective or objective sensory disturbances occurred.

In three cases of Landry's paralysis reported by Spiller, in one, intense alterations in the spinal cord were found; in another, changes in both the ventral, cornual cells, and peripheral nerves; and in the other, the changes were confined to the peripheral nerves alone.

This peculiar pathological distribution, which seems to characterize Landry's paralysis, may perhaps be explained by the select-

ive action of the toxin of the disease, it having in some examples a greater affinity for the peripheral nerves, and in others, for the spinal cord, with an especial predilection for the ventral, cornual cells.

Wickman and Harbitz and Scheel from an extensive experience with cases of poliomyelitis, presenting widespread motor paralysis, both of the ascending and descending type, state emphatically that Landry's disease is nothing more or less than a very severe, acute form of poliomyelitis. That there is a close resemblance clinically and pathologically, between the very acute forms of poliomyelitis, with widespread motor paralysis, and Landry's paralysis is undeniable, and, possibly, they may be identical, in so far as the anatomical situation of the lesions are concerned, but their identity has not thus far been definitely proven, hence, the above statement seems rather too sweeping and dogmatic. If we stop to compare the more prominent symptoms and pathological findings of the two diseases, we will see that certain, distinct differences actually exist. The severe acute forms of poliomyelitis with widespread motor paralysis are ushered in with very severe constitutional symptoms, high fever, and with severe headache, often with stiffness or rigidity of the neck, backache, and pain in the limbs. The prodromal period of Landry's paralysis is on the other hand very much less marked, and is often missed. The majority of cases are either afebrile, or accompanied with a very mild degree of temperature, and slight paresthesiæ, rather than severe pain in the head, back, or limbs, are the subjective sensory symptoms, when such exist. While the beginning of the paralysis in the latter disease may be abrupt, it is usually symmetrical and rapidly ascending, or, very rarely, descending in type, whereas, in poliomyelitis, the paralytic phenomena in the great majority of cases is less retarded usually, occurring simultaneously, following directly in the wake of the severe prodromal period; while the motor paralysis may be widespread, it is usually asymmetrical, as in the case herein recorded, and if death does not occur, one or more muscle groups usually escape, with early restoration of others, while other groups show marked atrophy and distinct electrical alterations. I have never observed a case of poliomyelitis with such widespread paralysis as I have seen in two cases of Landry's disease with perfect recovery, without some permanent muscular atrophy and altered electrical irri-

tability. I, therefore, believe with Buzzard and Weir Mitchell that the complete restoration of all the paralyzed muscles to their normal functioning, without muscular atrophy, and only rarely with altered electrical reactions, which is the rule rather than the exception, in the complex of Landry, is in sharp contrast to the results which occur in the cases of *acute*, severe, widespread motor paralysis of poliomyelitis.

Pathologically, while the changes are quite similar both in location and type, they are very much less intense in Landry's paralysis than in poliomyelitis, and the small, mono-nuclear, round-cell, perivascular infiltration, which is so characteristic of the latter disease, is missed in many of the true cases of Landry's disease. Of great interest in this relation is the recent cultivation by Flexner and Noguchi, by a specially devised method, from the tissues of the central nervous system of human beings and monkeys, subject to epidemic poliomyelitis, of a peculiar ovoid organism, that seems to be specific for the disease, as they have been able to reproduce experimentally poliomyelitis by the injections of cultures of their ovoid bodies. Such being the case, the identity of the Landry symptom complex with poliomyelitis rests on the cultivation in the former disease of the ovoid bodies, or determining their presence in smears and stained sections. With this in view, parts of the central nervous systems of the case herein reported of this complex were submitted to Dr. Noguchi, who has kindly consented to determine this point for me. I regret, however, to state that, owing to the stress of too much work, he has thus far been unable to render a decision.

From the standpoint of the differentiation of the two diseases, the results of the recent studies of Flexner, Clark, Wollstein, Joseph and Römer should be of great value, as they have shown that the blood serum from cases of poliomyelitis contain protective antibodies, which when mixed with the active virus of this disease completely neutralizes it, so that it may be injected intracerebrally into monkeys without inducing poliomyelitis; hence, with this serum or neutralization test, we should be able to establish the identity or non-identity of Landry's disease with that of poliomyelitis.

CASE I

A case of rapidly ascending motor paralysis of the type of Landry, which began suddenly in the muscles of the lower ex-

tremities, extended rapidly upward, involving in turn those of the trunk, upper extremities and diaphragm, and without subjective or objective sensory disturbances, resulting in death from respiratory paralysis eight days from the onset.

Robert M., aged twenty-eight years; single; trainman by occupation, stated that on January 19, 1912, when attempting to board his train, he had considerable difficulty in lifting his legs upon the steps to gain entrance to his car. The following day, after completing his run, he came home unaided. Without warning, while attempting to walk across the dining-room to his room, his legs suddenly gave way and he fell to the floor in a heap. He was unable to rise and was carried to his room and placed in bed. The following day—January 21, 1912—his physician was summoned and found him with a normal temperature, pulse and respiration, and with no other evidences of disease than that he was partially paralyzed from the knees down. His sensations were intact; he suffered from no pain, and the muscles and nerve trunks were not tender on pressure. His patella tendon reflexes were diminished and the plantar reflexes were lost.

January 22, 1912. Complete motor paralysis of the lower extremities were noted; no sensory loss; the tendon reflexes were absent; the pulse, respiration and temperature were normal.

January 24, 1912. The motor paralysis has ascended to the lower trunk muscles and those of the right upper extremity. The whole left arm is in a condition of paresis. All sensations are intact; no pain or nerve tenderness exists. The pulse rate is 90, the respiration 20, and the temperature is normal. His mind is clear. The bladder and rectum are perfectly controlled.

January 25, 1912. The trunk muscles are completely paralyzed. There is no disturbance of speech, and no difficulty in swallowing. His pulse is 90, respiration 20, and temperature normal.

On the morning of January 26, 1912, I saw the patient for the first time with Dr. McNab and made the following notes:

The patient assumes the extreme dorsal decubitus, and is absolutely unable to move the extremities, or to move from side to side, or to rise in bed. He is able to rotate his head and to partially extend it on to the chest. His respirations are 30—superficial and of the superior costal type. There is no evidence during inspiration of abdominal protusion. Litten's diaphragmatic sign is absent on each side. His vision is normal; the ocular movements are free; the pupils are mid-wide, equal, and respond to light, consensually, and to accommodation and to sympathetic irritation. The optic discs and retinae are pale; otherwise normal. The movements of the masticatory and facial muscles are normal. The tongue is protruded in the median line and the movements are perfectly free. The palatal muscles contract normally. There is no difficulty of deglutition or dysarthria. His mind is

perfectly clear, his expression is anxious, and his eyes are bright and staring.

Motion.—There is complete flaccid paralysis of the muscles of all four extremities and the trunk. The only muscular movements retained are those of flexion, rotation and extension of the head, and those of the tongue, eyes and face. The paralyzed muscles respond in a normal manner to electricity.

Sensation.—The sensations, both superficial and deep, were very carefully tested and found to be absolutely intact. There is no muscle or nerve tenderness, and no tenderness of the bones on percussion, or of the joints on movement. The spinal column presents no deformity or tenderness.

Reflexes.—The tendo-Achilles, patellar tendon, wrist and elbow jerks are absent on each side. All superficial reflexes are absent, including the interscapular. He has perfect control over the rectum and bladder.

Physical examination of his internal organs revealed no evidence of disease. The spleen is not to be detected by palpation nor outlined by percussion. The superficial lymph nodes are not palpable. The urine was normal.

I saw him again on the following day and he was in every way worse. His respirations were shallow and difficult; he was distinctly cyanosed. He could only articulate indistinctly and with great difficulty, and could only swallow liquids, and those with great difficulty. There was no discernible action of the diaphragm. His rectal temperature was 101.2, the pulse rate 96, and the respirations 30. His mind was perfectly clear and he suffered no pain. He had perfect control of his bladder and rectum, and no subjective or objective disturbances were discernible.

January 28th. Difficulty in breathing was extreme. He was markedly cyanosed; respirations, 52; pulse, 180 and regular. He had had several attacks of suffocation. The rectal temperature was 104. He died suddenly at 5 P.M.

Post Mortem Examination.—January 28, 1912. Body is that of a well-developed and nourished male adult, measuring 173 mm. in length. Rigor mortis present and marked. Pupils equally dilated. Lividity over back and dependent parts.

Abdomen.—There is a moderate amount of free fluid in the flanks. Appendix is normal. Peritoneal surfaces are smooth and glistening. The mesenteric glands are not enlarged. Large fecal impactions fill the entire large intestine, and those in the rectum are very hard. The diaphragm is at the fourth interspace on the right and at the fourth rib on the left.

Thorax.—The pleural surfaces are absolutely devoid of adhesions and perfectly smooth. There is no free fluid. The lungs are normal.

The *pericardium* contains three drachms of clear straw-colored serum. No adhesions are present.

The *Heart* throughout is apparently normal. The valve leaflets are thin, delicate and competent. The valves are free from thrombi and vegetations. The musculature is of good color and feels firm to the touch. The coronary arteries are clear and unobstructed, as is the aorta. The heart action ceased in systole; the left auricle and pulmonary veins being greatly dilated.

Lungs.—The lungs are voluminous and crepitant throughout, and are mottled on the surface with carbon pigment. On section there exudes a copious amount of frothy fluid. There are no areas of consolidation. The bronchi are free, and on pressure a large amount of serum exudes.

Liver.—The liver extends one finger's breadth below the costal border. It is of normal color and consistency and perfectly smooth, and the capsule is not thickened. On section the color is normal and the lobules stand out distinctly. There is no increase of fatty deposit present, and no marked congestion. The gall-bladder is filled with bile, and contains no gall-stones, and appears normal.

Spleen.—The spleen is normal in size and color, and is of moderately firm consistency. The capsule is not thickened. On section the pulp is firm. The malpighian bodies are visible, and there seems to be a slight preponderance of reticular tissue over the pulp.

Kidneys.—The kidneys are both alike and show no abnormality save that both are engorged with urine in the pelvic portion. The capsules are smooth and strip easily. The cut surfaces show moderate congestion of the pyramids. The glomerular capsules are visible. The cortices are abnormal in size. The stellate veins are not injected, nor are there any calculi in the pelvis.

Adrenals.—The adrenals appear normal.

Stomach and Intestines are negative; the latter even where the fecal impactions are extreme, show no change in the mucosa or walls.

The *Bladder* and *Genitalia* show no change. The former is dilated with urine, as are both ureters, which measure in some places 1.5 cm. in width.

Brain.—The skull and scalp show no change. The dura is free and otherwise is negative. No thrombi exist in the sinuses and no general congestion is present. The pia seems perfectly normal, as does the whole cerebral cortex and base. The blood vessels of the brain show no changes. The brain stem, pons, medulla, cerebellum and spinal cord appear negative macroscopically. The spinal cord, pons and medulla show no macroscopic changes on section. Cultures taken from the cerebrospinal fluid, heart's blood, brain, spinal cord, spleen and liver show no growth on Loeffler's blood serum.

Microscopical Examination

Kidney.—Section shows the tubules dilated in many places and filled with hyaline casts. There is a very slight increase in connective tissue.

Liver.—Shows a moderate chronic passive congestion in the periphery of the lobules and there is a slight degree of fatty metamorphosis.

The adrenals, pancreas, spleen and heart muscles show no changes.

Sections were made from various levels of the spinal cord, medulla and motor cortex and stained with hematoxylin and eosin, neutral red, Nissl's, von Gieson's and the Weigert Pal methods. The membranes of the cord and brain were normal. The small blood vessels of the ventral horns and intermediate gray matter were unusually prominent; many were dilated and contained thrombi. There was no perivascular or pericellular mono-nuclear celled infiltration. The vessel walls appeared normal. A moderate small round-celled infiltration existed throughout the ventral gray matter, and especially about the slightly dilated central canal. Scattered through the ventral horns of the entire spinal cord, but especially prominent in sections through the lumbar and cervical segments, were multiple small capillary hemorrhages. The ventral horn cells at all levels, but especially those of the lumbar and cervical regions, showed distinct degenerative changes. Many of the cells appeared swollen, irregularly shaped, with their chromatin network deeply stained or very granular and pale. Some cells showed marked central chromatolysis with the peripheral granules intact, whereas others showed both central and peripheral chromatolysis, with displaced nuclei, whose nuclear envelopes were wavy or irregular in outline, and showed distinct fragmentation. A few cells were devoid of their nuclei and their Nissl bodies were degenerated into a fine dust. The normal pigmentary substance or lipoid of the cells was greatly in excess. Many shadow cells existed with absent nuclei, and with only a few scattered degenerated tigroid bodies. Some of these cells contained leucocytal inclusions and rested in dilated pericellular spaces, while the dendrites were, for the most part, preserved. Some cells were devoid of them, and there was in many of them a paucity of the Nissl bodies. Very slight chromatolytic changes existed in a few of the cells of Clarke's column. They were otherwise normal, as were the cells of the posterior horns and those of the posterior spinal ganglia. The ventral nerve roots showed slight degenerative changes, doubtless secondary to the changes in the cells of the ventral cornua. The posterior nerve roots were normal. The intracornual nerve network appeared normal. Sections through the motor cortex, pons, and medulla showed no definite changes. The peripheral nerves were normal. No degenerative changes were discovered in the white columns in sections stained after the method of Weigert-Pal.

CASE 2

A case of acute polio-myelitis in a young adult, involving the muscles of both upper extremities and those of the left lower extremity. Death at the end of five days of respiratory paralysis.

The patient, Mr. M. F., aged nineteen years, clerk by occupation, had always been in good health until the evening of July 13, 1913, when on his return from a visit to Kinderhook Lake, he suddenly sickened, with a temperature of 104, excruciating headache, pains in the limbs and back, nausea and severe vomiting. The bowels were constipated, but were quickly relieved with calomel. On the day following he was greatly surprised to discover that both of his arms were almost powerless and that he could move only the foot and toes of the left leg. The right leg was left unaffected. He complained of no pain or subjective sensory disturbances. His febrile reaction continued from the day of onset until Friday noontime, when it dropped to normal. I saw him, in consultation with his physician, Friday, July 18, at 3:30 P.M., and found him in bed with distinctly flushed face, and lips and finger tips cyanosed, and suffering from marked dyspnea. His respirations are 40, very superficial and of the superior costal type. There are no abdominal respiratory movements. Both leaflets of the diaphragm are evidently paralyzed, as no evidence exists on either side of Litten's diaphragmatic shadow. The pulse rate is 130; regular and easily compressible, with systolic blood pressure 110 mm. hg.; D. B. P., 80 mm. hg. He can move his head in all directions. There is no rigidity of the neck muscles, and those of the trunk seem uninvolved. His pupils are equally contracted, but responsive to light and accommodation; the ocular movements are free; his visual fields are normal, and the optic discs and retinae show no changes. There is no difficulty of deglutition. The facial muscles are intact. The tongue is protruded in the median line. His voice is normal and mind perfectly clear. There is no disturbance of hearing or of the sense of smell or taste. The bladder is controlled. There is complete motor paralysis of the muscles of both arms and paresis of those of the forearms. The left lower extremity only permits of abduction, adduction, flexion and extension of the foot and normal movements of the toes. The movements of the right lower extremity are perfectly normal.

Sensations.—There is no tenderness of the skull or spine, or of the long bones on percussion. The nerve trunks or muscles are not tender on pressure. The Kernig and Brudzinski signs are absent. There are no objective sensory disturbances.

Physical Examination.—Physical examination of the internal organs showed only an enlarged palpable spleen. No enlarged lymph nodes are present. The patient died rather suddenly Friday evening of respiratory failure.

The post-mortem examination was confined to the central nervous system. The dura was normal; sinuses free. The pia arachnoid showed increased vascularity. No exudate was observed. There was an increase of the cerebro-spinal fluid. Otherwise the brain appeared normal.

Spinal Cord.—The membranes of the spinal cord were deeply injected, and there was an increase of cerebro-spinal fluid. The spinal cord on section showed, in the region of the central gray matter, remarkably increased vascularity, which gave that region a deep purple or velvety appearance, thus making the letter "H" stand out clearly in sharp contrast to the surrounding white matter.

Microscopical Examination

Spinal Cord.—The most obvious change is a remarkable perivascular and interstitial round-cell infiltration universally distributed throughout the spinal cord, being most marked in the cervical and lumbar regions. While this infiltration is particularly striking in the ventral horns and intermediate gray matter, it is not confined to these regions, as it exists to a lesser degree in the posterior horns and surrounding white matter. The pia mater, especially that portion covering the ventral surfaces of the cord and medulla, shows both a diffuse and vascular mono-nuclear, round-cell infiltration. Many of the centripetally coursing vessels, supported by the delicate sub-pial neuroglia septa, show marked adventitial infiltration. The dura is normal throughout. The central canal seems enlarged and contains a number of small round cells. The ganglion cells, especially those of the cervical and left lumbar segments, are greatly reduced in numbers—which I believe is explainable by the accompanying edema, and show all stages of degeneration, from slight early chromatolysis to absolute destruction, and many cells are the seat of an active neuro-phagocytic process. The blood vessels, especially of the ventral gray matter, are dilated and full of blood corpuscles. No capillary hemorrhages were observable. The round-cell infiltration is chiefly of the lymphocytic type, with small deeply stained nuclei, with non-granular protoplasm; diffusely scattered through the gray matter are a number of larger cells, with granular protoplasm, that may be polyblasts or glia cells. The ventral or dorsal nerve roots show no definite change.

The Weigert stain shows no degeneration of the fibers of the white columns of the cord. Considerable separation of the fibers exists, however, as if from the compression of edema. Similar changes, although not as pronounced, exist in the medulla and pons, especially in the region of the cranial nerve-nuclei and in the pia.

The cerebellum appears normal. The para-central lobule

shows both a diffuse and vascular, round-cell infiltration. The pyramidal cells of the cortex show no pronounced alterations.

I have endeavored to contrast the symptoms and pathological findings of a typical case of the Landry symptom complex with that of a case, also typical of the adult type of poliomyelitis, with widespread motor paralysis.

The first case reported is interesting, because of the rapid ascending motor paralysis beginning suddenly in the muscles of the legs, involving in turn those of the thighs, trunk, upper extremities and diaphragm, resulting in death from respiratory paralysis, eight days after the onset, without subjective or objective sensory disturbances, or other prodromata, and continuing afebrile until the day preceding death, the postmortem presenting no macroscopic changes. Microscopically, were found degenerative changes, confined to the ventral cornual cells and intermediate gray matter, together with small capillary hemorrhages, without edema, or round-cell infiltration, either of the vascular walls or the pia.

The second case, on the contrary, was ushered in with marked prodromata, high febrile reaction, and was followed twenty-four hours later by paralysis of the muscles of both upper extremities, diaphragm, and those of the left lower extremity, while those of the right lower extremity remained uninvolved, death following in five days from respiratory failure. The autopsy showed great vascularity of the pia-arachnoid of the brain and cord, intense vascularity of the spinal gray matter with remarkable round-cell infiltration, both interstitial and vascular throughout the spinal cord, being less marked in the medulla and motor cortex.

CONCLUSIONS

1. I wish to lay especial emphasis on the absence in this case, and the one heretofore recorded, together with many of the recorded cases, of the Landry complex in the literature, of mononuclear round-cell infiltration of the pia, and of the vascular walls, which is so characteristic pathologically of poliomyelitis.

2. I believe from the study of the case herein recorded, and from a careful survey of the literature of Landry's disease, and that of poliomyelitis and multiple neuritis, that we still have a group of cases such as has been portrayed in this paper, identical, or at slight variance with Landry's original description. These cases cannot be relegated either on clinical or pathological evidence, to the adult type of poliomyelitis or multiple neuritis. In view of the facts here presented, I believe that the term "Landry's paralysis" cannot be dropped.

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CONTUSION OF THE BRAIN¹

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Concussion is looked upon by many writers as a molecular vibration in the brain substance. On the other hand Kocher,¹ Keen² and others believed that there is an actual injury to the brain substance. In support of the former contention, the experimental work of Koch³ and Filehne and that of Witkowski⁴ on dogs shows that fatal concussion may be caused without more than evidence of hyperemia of the brain and its coverings.

Recently I have been called upon to examine a number of patients who had received injuries to the head and in whom symptoms of so-called concussion have lasted several days, also one patient with localizing symptoms who recovered, and one with localizing symptoms who died. I have been able to add to these a case kindly furnished me by Dr. W. G. Spiller. As a result of this experience I was led to make a study of the subject of contusion of the brain from a microscopic standpoint, as well as, in part, clinically. The number of cases is scarcely large enough to permit of any positive deductions, but some interesting features of the subject have been developed as a result of this study, the results of which may be looked upon as a preliminary report.

I found in the first place that the study of contusion of the brain is largely neglected by neurologists and on the other hand that comparatively little has been written about the subject even by surgeons. At first after reading Phelps's⁵ paper on the subject in which he so ably and exhaustively deals with contusion and laceration of the brain I was tempted to drop the subject entirely. His paper however treats of the pathology of the subject from a macroscopic standpoint largely.

Little has been written since his paper published in 1893 and

¹ Read by title at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914. From the laboratory of Neuro-pathology, University of Pennsylvania, and the Philadelphia Polyclinic and College for graduates in Medicine.

this brief paper on the subject is warranted, I believe, by the fact that sufficient attention has not been given since to the subject by neurologists, whose assistance is or should be sought in each case before operation is decided upon.

Phelps analyzed 124 cases of brain injury occurring in his own experience. As a result of this study he stated that laceration and contusion were first in frequency and importance among all the injuries to the head. Contusion he stated may occur without lacerations and vice versa but they are usually associated.



FIG. 1. Case 1. Showing subdural and subpial hemorrhage.

There were 28 cases of laceration without noticeable contusion in 58 cases, and but 10 cases of contusion without lacerations. By laceration he means a tearing of the tissue, the wound containing a coagulum beneath which is found a granular detritus of the brain structure. He described subcortical laceration as a simple extravasation of blood into the deeper tissues. In contusion he claims there is no solution of the continuity of the brain fibers but there are minute hemorrhages in the brain substance.

In Phelps's experiences the lacerations occurred more especially on the basal surface of the temporal and frontal convolutions but all parts of the brain may be affected, including the pons, cerebellum, the corpora striata and the gyrus fornicatus. Lesions may



FIG. 2. Case 1. Showing area of softening in cerebellum.

be superficial or deep, or may implicate the interior of the brain without reaching the surface. The membranes may or may not be involved and the pial hemorrhage may extend over large areas. The hemorrhage may be the only lesion in some places.

Kocher (in 1901) has given the best description of the subject since Phelps's paper. He quotes six cases, five of them fracture of the bones of the skull and one, a case of marked contusion aggravated by excephalitis. Contusion of the temporal lobes, of the left frontal lobe and of the lower surface of the frontal lobe was observed in these cases caused by contre-coup and there was associated, epidural and sub-dural extravasation.

Page⁶ in 1902 in discussing the subject of concussion of the brain in some of its surgical aspects described bruising of the brain tissue, not only at the seat of injury but also at a point opposite, due to contre-coup or the tearing of the walls of the brain from sudden displacement of the cerebro-spinal fluid from the lateral ventricle through the Sylvian aqueduct and fourth ventricle.

In the cases briefly to be described the chief points of interest

are as follows: Extensive pial hemorrhage may exist without any injury to the cortex or cortical cells. Contused areas showed fairly sharply defined infiltration of blood with little demonstrable effect upon the adjoining cortical tissue. An inflammatory process was not found in the brain tissue. No evidence of a proliferative process was observed in that portion of the pia which was the seat of the hemorrhage. Injury to the brain appeared in some places to be due to hemorrhage extending from the pia. The cortical cells adjacent to the hemorrhagic infiltration of the cortex did not appear to show any evidence of degeneration.

The question arises, is it not advisable to drain the hemorrhagic area in the brain by an incision and thus relieve the pres-



FIG. 3. Case 1. Showing subpial hemorrhage which extruded into the superficial cortical layers.

sure and ultimate destruction of the brain tissue which would ensue if the hemorrhage were allowed to remain? If the bruised areas were drained would not the tissues have less of a tendency

to undergo softening and would not the relief of the pressure add to the chances of saving life?

CASE 1. E.McQ., aged 61, was admitted to the Philadelphia General Hospital, April 28, 1906, and died three days later. There is no history of injury but there is no doubt from the autopsy findings that she must have had some serious blow or injury before admission. The examination by Dr. Spiller was as follows: She had recurrent convulsive attacks involving the left side of the face in the upper as well as the lower distribution. The eyeballs were jerked to the left clonically and there was a slight jerking of the right eyelid in addition to the violent spasms of the left. The right arm was flexed at the elbow and the left



FIG. 4. Case 2. Showing areas of contusion—and hemorrhage into cortex.

arm and both legs were rigid at first. This was followed by clonic spasms in the left arm and both legs but not in the right arm. She was slightly stuporous between the convulsive attacks but replied to questions although unreliably. These convulsions occurred about every 10 or 15 minutes.

The left side of the face was distinctly paretic in both the upper and lower distributions of the facial nerve. She closed the eyelids of the left side but with less force than on the right. The tongue was protruded straight. There was left hemianopsia. Sensation to touch and pain was diminished on the whole left side of the body, including the face. The left arm and leg seemed to be completely paralyzed. The triceps and biceps tendon reflexes were very prompt on both sides but more so on the left.

The left arm and leg were flaccid. The patellar reflex was prompt on each side and a little more so on the left. The Achilles jerk was not obtained on either side. There was no ankle clonus and the Babinski phenomenon was uncertain on the left side and probably absent on the right. At a previous examination it was present on the left side.

Two days after admission the patient was operated upon, a diagnosis of brain tumor having been made in the absence of any history of injury. The skull was opened on the right side over the motor area. No tumor was found but when the dura was opened large quantities of fluid somewhat blood tinged escaped. The hemorrhage was readily controlled and the dura was allowed to fall into place without suturing. The patient died the following day.

In the brain there was found on the right side in the region of the frontal lobe and especially over the face center an extensive sub-pial hemorrhage which extended down to the basal surface. There was also an area of hemorrhagic infiltration in the region of the arm center. A hemorrhagic area in the temporal lobe on the basal surface was observed. In addition to this a sub-dural hemorrhage in the region of the parietal lobe on the right side was seen and in the posterior part of the left cerebellar hemisphere there was also an area showing softening from bruising or contusion.

Microscopically in the precentral region there was seen a hemorrhage which at first sight appeared to be a hemorrhagic area in the brain cortex but which proved to be an accumulation of blood beneath the pia which pushed the brain matter down beneath it. Just beneath the pial hemorrhage the cortical tissue showed very little damage. The main lesion consisted of a hemorrhage into the cortex at the site of the contusion. In the tissue adjoining the area of contusion there was some rarification of the tissue and space formation. In the frontal region there was a hemorrhage between the pia and the arachnoid which pressed down on the cortex. In most places the cortex was perfectly normal but in one place the hemorrhage had extended into the cortex. The pia, at the seat of the hemorrhage was vascular, and the walls of the vessel were thicker and the lumen larger than normal. The pia itself was thickened and stained amorously. There was not found any round cell infiltration.

Adjoining the hemorrhage into the cortex were smaller hemorrhages and space formation. In one section an enormous pial hemorrhage did not materially injure the cortex and in only a small area was there seen any disintegration of the cortex from the hemorrhage. There was in the pia very extensive hemorrhagic extravasation which occurred independent of any implication of the cortex.



FIG. 5. Case 2. Showing areas of contusion.

In the areas of contusion the brain substance was infiltrated with red blood cells to such an extent as to entirely mask any of the normal appearance of the brain. Adjoining this before reaching normal brain tissue were seen many microscopic hemorrhages. Here the ganglion cells could be seen well stained and intact.

There was no evidence of any inflammatory process or reaction. The sections stained with thionin showed no degeneration of the nerve cells in the cortex.

CASE 2. F. S., aged 53, was admitted to the Philadelphia Polyclinic Hospital on January 24, 1913. He was brought into the accident ward in an unconscious condition having been knocked down in a fight, his head as he fell striking the cement floor of an abattoir where he worked. There was no external evidence of injury with the exception of some contusion over the left eye

and in the occipital regions. He was not entirely comatose upon admission but did not make replies to any questions. He was restless and red faced. The pupils were contracted and reacted to light. As far as could be ascertained there did not seem to be any paralysis upon admission.

On January 26 two days later he was still unconscious and there was incontinence of urine and feces. Both knee jerks were increased and there was a Babinski phenomenon on the left. On this date two days after the accident there was observed twitching of the right side of the face which became almost constant and continued until the patient died five days later. On the twenty-eighth two days after the convulsions of the face began, the right arm became the seat of clonic convulsions and on the following day the right leg also became involved. He died seven days after accident without regaining consciousness.

At the autopsy a fracture of the base of the skull extending from the occipital region to the frontal region on the left side was found. The whole brain was very badly bruised. In the left precentral region involving the second and third frontal convolution in their posterior parts there was an area of hemorrhagic softening measuring 6 cm. by 3 cm. Extensive sub-pial hemorrhage surrounded this area and extended forward and downward to the basal surface. There was a sub-dural hemorrhage in this region also. On the basal surface of the brain could be found areas of softening or contusion of the brain tissue occupying the region of the anterior temporal lobe and the anterior portion of the frontal lobe. Surrounding these areas was found extensive hemorrhage into the pia to a greater or less extent.

Microscopically studies were made of the contused areas. The pia arachnoid was in places alone involved, the hemorrhage separating the pia from the arachnoid. Beneath these places the cortex was intact, showing nothing abnormal with the nuclear stain and no destruction or alteration of the cells when stained with thionin.

In the areas of contusion the brain substance was infiltrated with blood and here there could be seen no traces of the normal brain tissue. Adjoining these areas minute hemorrhages were seen in the cortical layer for a short distance in transition to healthy brain tissue. The cells in these localities showed no change though perhaps they took the stain less intensely than the normal. Just adjoining the extensive hemorrhagic infiltration of the cortex in one place the cells stained poorly by the thionin stain and a few very poorly or not at all. In the pia there was no evidence of proliferation or exudation of round cells, nor in the cortex at the seat of contusion was there any round cell infiltration.

CASE 3. W. B.: aged 46, was admitted to the Philadelphia Polyclinic Hospital on December 16, 1913. He was in a some-

what dazed condition upon admission and complained of pain in the head, having received a contused wound in the right parieto-occipital region. Twenty-four hours later he had a general convulsion. Upon examination two hours after the convulsion his condition was as follows. He was confused and had difficulty in expressing himself. Further examination revealed the fact that he was aphasic. He was unable to understand spoken language or writing and was unable also to express himself, although there was no anarthria. There was a tendency to divergence of the right eye. The pupils were very small but reacted promptly and the rotation of the eyeballs was good. There was possibly a slight twitching of the right external rectus. When examined by Dr. Peter the next day, the eye grounds were practically negative.

On the following day an examination showed in addition to the aphasia some apraxia. For example repeatedly when asked to close his eyes he would show his teeth or he would make a fist.

An X-ray examination showed a possible fracture in the right occipital region. There was a gradual improvement in his condition, including disappearance of the aphasia and apraxia which persisted for about a week. His chief complaint then consisted of pain in the occipital region and over both scapulas. Mentally he was very slow and answered questions in monosyllables.

At the end of five weeks he was discharged cured. (A week later he committed suicide by inhalation of illuminating gas.)

This case was one in my opinion of contusion or perhaps laceration of the temporal region on the left side causing apraxia and aphasia. The hemorrhage into the cortex must surely have been absorbed allowing thus the function of the brain tissue to be restored, the pressure being relieved by absorption of the hemorrhage.

It would seem to me in studying the cases of so-called concussion, in which the symptoms persist for several days and in which even weeks pass by before the patient regains the normal state that the condition is best explained on the basis of a contusion or actual injury to the brain substance itself. The brain becomes bruised as it is thrown against the bony structure of the cranium. The difference between concussion and laceration is one largely of degree, there being no sharp line between concussion and contusion on the one hand or contusion and laceration on the other.

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Translations

VAGOTONIA

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER AND DR. LEO HESS

OF VIENNA

TRANSLATED BY WALTER MAX KRAUS, A.M., M.D., AND
SMITH ELY JELLIFFE, M.D., PH.D.

(Continued from p. 603)

The voice sounds hoarse and husky, is easily roughened and the action of the vocal cords is very powerful. Manifestations of a diminished tone in the rima glottidis, resultant upon a faulty closure of the apertures made by the vocal cords, contrary to the case with sympathicotronics, are never found in vagotonic.

Later, we shall make mention of the variations in the structure of the thorax. Respiration is often shallow and is diminished in rate. The patient frequently sighs deeply after which there is a long pause in respiration. At the same time the patient puts his hand to the precordium, becomes momentarily excited, complains of a feeling of pressure and an inability to expire. Anomalies of inspiration are also to be found when the lower limits of the lung are examined. It often happens that there are great variations in the position of the diaphragm. If one day the lower border of the lung be found to lie at the fourth rib on the right side, rest in bed will cause it to drop two intercostal spaces by the next day. If the heart seems very much excited on examining the interior thoracic wall, it may become worse when the lung borders are reduced. A pulsation may be felt and seen in the region over which the sounds of the pulmonic valves are best heard. And also, in the epigastrium and at the apex, a marked pulsation is noticeable, as is found when severe damage to the heart exists. The apex beat may be heaving and hard to depress, without there being any anatomical lesion of the heart. The heart sounds are

clear, loud, often split and rapid, the pulmonic second sound much accentuated and sometimes also split. Percussion shows no abnormalities. Only when the pulmonary hepatic border is particularly high can one find a slight increase in the dulness to the right.

If the patient remain quietly in bed for a few hours, the cardiac excitement subsides. Sometimes a persistent thymus is demonstrable both by percussion and X-ray. The activity of the heart, as shown by its rate, may vary greatly. It is striking that even when patients of the nervous type which is being described, are under stress of excitement, the heart rate often does not rise above 60, and may even be less. However, the patients will often say that the rate of their heart increases paroxysmally, and that it is in these periods of relief from bradycardia that they feel better. At times, there is a feeling as if the heart would cease beating entirely, or that it is very irregular. These times are exceedingly trying for the patient. Accompanying these sensations there is often one of a wave of blood passing upward through the neck and into the head. Feelings of pressure over the heart cause the patient considerable discomfort. The lability of the cardiac action, a phenomenon which may be discovered both by auscultation and by palpation of the pulse, is most striking. Small and large pulsations follow one another, not always in rhythmic sequence, and very slight exertion as, for example, getting up or walking about, suffices to cause a sudden transition from a bradycardia to a tachycardia. At times quite the opposite may be found—as for example the bradycardia which Erben¹⁹ found after kneeling.

The respiratory changes found in the pulse are also very striking. Deep inspiration will cause slowing at first, followed at the height of inspiration by acceleration. In expiration, the heart beats more rapidly than in inspiration. The vagotonic may suffer from arrhythmias, particularly after a heavy meal. Such arrhythmias may appear in susceptible people after drinking one or two glasses of carbonated water. It is easy to see that the transition from these apparently physiological conditions to that of a true cardiac neurosis is very simple.

The gastro-intestinal tract gives evidence of many abnormalities as well. The vagotonic declares that large pieces of food stick back of the heart after swallowing. Soon after beginning a

¹⁹ Erben, S. Ueber ein Pulsphänomen bei Neurasthenikern. Wien. klin. Woch., 1898, No. 24.

meal feelings of fulness and distention come over the patient, though his appetite is not yet appeased. Sometimes the abdomen is seen to swell in the gastric region under the left costal margin. Relief is obtained by belching which is brought about by taking some bicarbonate of soda. Others complain of acid retching which may even attain the severity of heart burn. The appetite is variable though generally very good. The activity of the bowels is sluggish, yet now and then there are periods of unaccountable diarrhea to which the patient pays little attention, since in their experience these attacks had hitherto been a great relief. Stools are few in number and seldom bulky. These people know very well that if their diet consists largely of vegetables, and other foods rich in residue they are less costive and have fewer troubles. A diet almost exclusively made up of carbohydrates is very poorly borne, since it is just this diet which gives the sensation of pressure in the stomach. The abdomen as a whole shows little that is at all characteristic. The sigmoid, filled with feces, but rarely very thick, frequently may be felt. Coils of intestine, tightly stretched out, or filled by pseudofecal tumors are rarely to be found in these individuals. Splashing in the region of the stomach directly after eating or after drinking a great deal of fluid is also very infrequent.

Vagotonics pass their urine in small amounts and at frequent intervals. It is, as a rule, brightly colored and may precipitate out a "sedimentum lateritium" in cold weather. Frequently an abundant nebula is found. Besides this the urine is rich in oxalic acids. It is sometimes excreted as a cloudy fluid due to an overabundance of phosphates, or, at least, precipitates the phosphates after excretion.

These urinary conditions are associated usually with urinary hyperacidity. This seems all the more probable since it is just where gastric hyperacidity is found that we run into these conditions. Usually there is also found an excess of carbonates in the urine and particularly after meals it may form on addition of acids. In many cases, there is slight dysuria, the patient having to strain or wait a few minutes before the urine can be voided. Other patients declare that the stream is broken. Dribbling after micturition has ceased is often admitted after questioning, much as is the case with the other symptoms, which we have described as characterizing the vagotonic.

The vagotonic is often sexually very excitable. Erections of the penis are frequent though of short duration. Premature ejaculation often occurs. Others complain of frequent pollutions.

Certain nervous stigmata are almost always present. The tendon reflexes are increased. Sometimes Chvostek's sign may be obtained. The cremasteric, abdominal and muscle reflexes are active. Tremor of the eyelids and tongue, as well as of the extended fingers is almost never absent. Dermography is usually marked.

Most of the symptoms which have been described give the patient no trouble at all, and are only discovered after careful questioning. Many latent signs of autonomic irritation are first found in this way, and thus lead on to further search. In the domain of the vascular system, reflexes are often obtained which we have just discussed, bradycardia after pressure upon the eye, or stimulation of the nasal mucous membrane by ammonia, tobacco smoke, etc. If atropin be dropped into the eye, marked mydriasis and disturbance of accommodation result, while if pilocarpin be used, there result uncomfortable feelings, besides the accommodation spasm. The stomach is much contracted. Frequently a striking hyperacidity begins. Findings of 70-100 Riegel units after a test meal of three pieces of zwieback and 300 c.c. of water (removal in 40 to 45 minutes) are not at all unusual. The stool estimated by its condition in any twenty-four hours is scanty and poor in water and often has the form seen in spastic constipation. If the tone of the sphincter ani be tested with the finger it is often found much increased, there being a strong resistance. Pneumographic curves show irregularities in respiration, while the sphygmogram shows the respiratory conditions which have already been described, and spirometric curves show the type of respiration above mentioned. The blood shows an eosinophilia. For the sake of completeness, the results which are obtained with pilocarpin (.01 gm.) and adrenalin (Parke Davis, 1 c.c.) subcutaneously administered will be noted. After the former, the vagotonic salivates and sweats profusely, while after the latter there are scarcely any subjective symptoms, and in the typical vagotonic neither polyuria nor glycosuria. People so constituted are found in large numbers in the dispensaries if the trouble be taken to find them.

(To be continued)

Society Proceedings

FORTIETH ANNUAL MEETING OF THE AMERICAN NEUROLOGICAL ASSOCIATION

HELD AT ALBANY, N. Y., MAY 7, 8 and 9, 1914

The President, DR. HENRY HUN, in the Chair

(Continued from page 583)

REPORT OF A CASE OF DOUBLE ALTERNATING SOMNAMBULISTIC PERSONALITY

By D. J. McCarthy, M.D.

A study of a case of alternating personality, with analysis of the possible factors concerned in the production of the pathological mental state and therapeutic results.

Dr. A. R. Allen said that Dr. McCarthy had stated that he was not a Freudian. Dr. Allen was happy to hear him so express himself. He objected to the use of Prof. Freud's name as a designation of those who find truth in a philosophy in the development of which he has played so active a part. He knew nothing of Dr. McCarthy's case as he did not see it, but was very much interested in Dr. McCarthy's presentation. He wanted to call attention to the fact that his method of getting at hidden complexes through hypnosis was the method that Freud used until he found a number of cases he could not uncover through hypnosis. In other words there is nothing essentially different from the approach of the Vienna school. He added that he thought very likely had Dr. McCarthy had many more opportunities of seeing the case he would have discovered much more than he did. He did not quite understand Dr. McCarthy when he said he did not believe that the patient had forgotten a certain event. Mayhap this event was not unconscious in the sense of the Vienna school. But Dr. McCarthy has said nothing about the "Vorbewusste." We know perfectly well that the content of the "Vorbewusste" though possibly not so potent as that of the unconscious yet must be reckoned with as an etiological factor in the neuroses, especially when that content has to do with a painful episode the memory of which has even been "affektlos."

PSYCHOANALYSIS CONSIDERED AS A PHASE OF EDUCATION

By JAMES J. PUTNAM, M.D.

The kind of education which this paper has in mind is that which has to do with ethics, religion and philosophy. The thesis to be maintained is that psychoanalysis can render here a service analogous to that rendered

by logical methods in all forms of reasoning. Psychoanalysis can, namely, help to detect false conclusions and false inferences dictated unconsciously by personal motives, such as craving for admiration and attention, undue self-assertion, concealed sensuousness, etc.; and there are certain basal principles of psychoanalytic reasoning bearing on these matters which parents and teachers could be trained to understand and to utilize as guides to observation and character study. On the other hand, the sciences of ethics and philosophy, and especially of logic, have something to teach which psychoanalysts could study with profit. The conflicts of psychoneurotics are often based in part on desires and crude logical inferences of good sorts. It would be intolerable and inadmissible for the physician to attempt to impose his own views, as such, upon his patients; but if well trained in logical method and the principles of sound ethics and philosophy he can, at suitable moments, aid them to develop their own views in desirable directions.

Dr. Mills said he feared that, being a Philadelphian, he was somewhat stupidly practical regarding certain psychological and other matters. He did not intend to discuss this able paper of Dr. Putnam's, but he would like to ask him two or three questions. What was running through his mind while Dr. Putnam was reading his paper was this: How are we as parents, how are we as teachers to carry out the suggestions of Dr. Putnam? How are we to apply them practically? He would like Dr. Putnam to take a child say at three age periods,—one at the age of 8, one at 12, and one 16 years old. What does he wish the parent or teacher formally to do? How is he to approach the child, how talk to or instruct the child? How much time by the day or week should be devoted to this particular object? How is the teacher in the secondary, intermediate, grammar or high school grades to exercise his powers to the end desired by Dr. Putnam under our present system of education? Does not the child after all through our ordinary methods receive the impressions and guidance desired by Dr. Putnam?

Dr. J. W. Putnam said psychoanalysis in childhood does not always find a sexual basis nor develop it. He called to mind a patient brought to him, a child ten years of age, who suddenly refused to go to school any longer. Neither the parents nor teacher could find the reason, and the family physician obtained simply a refusal. The discussion in trying to find the cause brought the child into a more or less nervous condition, and she gradually refused to play and was unable to go to school. The child was brought to Dr. Putnam, and by questioning he found she was afraid to speak before her mother. He sent the mother out of the room, and told the child he would not say anything to her mother about what she told him without her permission. After a few tears she told him she sat next to a little girl, who was a good deal younger than herself. This little girl had a pencil and the patient had stolen it and had intended to give it back but had lost it, and that was her reason for not wanting to go back to school. This occurrence had brought this child to the verge of hysteria, and all the careful work on the part of parents and teachers had failed to get the child's confidence. A great many cases of disturbance in child life are based on the remarkable consciousness of the child. Slight faults are exaggerated into vices in the child mind. In a large number of cases there are over-conscientiousness and over-exaggeration of very simple matters. Dr. Putnam felt that psychoanalysis in childhood is useful and will often unearth a great many simple faults. The child he had referred to went back to school, he had her permission to tell the parents and teacher and he

told her that all things would be straightened out by her giving five cents to the other child for a new pencil. There were no further developments in the case.

Dr. Southard believed that too much attention can easily be paid to consciousness, and especially to self-consciousness, in laying a basis for the theory of education. The theory of education can easily be over-rationalized. Freudian psychoanalysis, it seemed to him also over-rationalizes all situations with which it deals. The proceedings of the Freudian so-called "censor" are probably quite too rational to be real.

The rise of voluntarism and pragmatism in the last century and in contemporary theoretical psychology represent a proper protest against the over-rationalization of mental proceedings which Hegel surely represented.

From his own (possibly private) point of view he felt that the part played by concepts, ideas, intellectual schematism, in the operations we term psychic, has been over-emphasized. The so-called psychic "traumata" (*sit venia verbo*) are to his mind far too intellectual and conceptually describable to be accepted as wholly convincing. He believed we have paid too much attention to educating the centers back of Rolando, or, roughly speaking, the posterior association center of Flechsig and too little to training the centers forward of Rolando, or, again roughly speaking, the anterior association center of Flechsig. Or, put another way, education should consider the behavioristic data of the modern so-called objective psychology and not confine itself to the introspectionist data. And this point may be made independently of whether you wish to agree with his own lately expressed opinion to the effect (a) that so-called psychic behavior is a function of the anterior association center and (b) that introspection largely taps the posterior association center. If there be anything in this conception, no kind of introspective analysis, not even the most penetrative Freudian kind, is likely to get more than (at best) a kinesthetic history of some of the patient's most important activities; and such an analysis cannot claim to rationalize such activities, because perhaps no rationalization is a priori possible. Training for power, therefore, may well desert the field of reason and consider the upbuilding of proper habits and inhibitory tendencies, to be known by their fruits.

Dr. Onuf thought as psychoanalysis is rather a young science it is worth while to consider what it has done up to the present time. The problem can be considered in two ways, the wider understanding it has given us of certain phenomena and its therapeutic value. Dr. Onuf thought that on the whole there has been more willingness to concede the value which psychoanalysis has given us for the understanding of mental processes and much more reluctance to acknowledge the therapeutic value.

Among Freud's followers there first was great enthusiasm and expectation of what psychoanalysis would do in the cure of psychoneuroses. Gradually, however, even the best men have found that the field of efficiency has to be narrowed in, quite considerably, and the conditions in which it has actually proven of curative value have become very few.

One strong objection to the treatment of conditions of long standing is, that the method takes very much time, requiring a long duration of treatment, and even then the results are doubtful, so it would seem more and more that if anything is to be done therapeutically it is to be done by applying the method to the young, to the child.

Similar facts have been brought before us by the study of the internal secretions. We now know that if a child affected with marked cretinism—he referred here mainly to the sporadic form based almost purely on hypo-

thyroidism—is treated by thyroid-feeding at a very early age and remains under constant treatment, it will recover entirely, that is, it can be brought up to and maintained on a normal standard provided that the treatment be continued all the time, whereas, if the treatment is first installed in the adult, it is not efficacious any more or at least only partially if at all. This is a very trite, simple proposition in cases of well marked hypothyroidism. In very mild cases of this disorder, however, those which the interesting clinical studies of Hertoghe and Levy and Rothschild have taught us to diagnose, the problem becomes a much more involved one, because of the difficulties of diagnosis, and many persons as they go along in life become permanently “crippled” so to say, because, when children, their condition was not recognized, and they could therefore never again receive the same benefit which they would have received had their condition been understood and the appropriate treatment applied in childhood. Dr. Onuf thought the same applies to psychoanalysis in this way that if certain mental traits and trends, needing correction, are recognized at a very early age through the guidance of psychoanalysis, proper educational means can be applied and gratifying results obtained, whereas, if the situation is not paid attention to, we have the condition before us of the plant that has grown roots, and in order to remove these without greatly disturbing the ground in which they are implanted, each root has to be followed to its smallest branches, a task almost impossible to accomplish. It is in this respect, that Dr. Putnam's remarks are of great value, showing us how psychoanalysis may achieve the greatest results with expenditure of the least possible amount of energy.

Dr. Knapp conceded that the modern methods of psychoanalysis may give, even without symbolic interpretation, the absolute facts in regard to the case,—of which he was himself very skeptical,—he was forced to confess that Dr. Putnam's suggestion with regard to obtaining from the study of abnormal children a guide to procedure in the education of the normal child is a little bit indefinite. If we obtain data from the normal person the study may add to our knowledge, but the attempt to realize data for the normal from the abnormal is really putting the cart before the horse.

Dr. J. J. Putnam said that Dr. Mills's question was a very pertinent one as to what parents and teachers shall do in this respect. They should not, in his opinion, do anything formally except educate themselves. What he wished to help to bring about is that parents and teachers should make themselves better parents and teachers by obtaining a deeper knowledge of what their own motives and the influences that have affected them have been, and what a child's motives are and what the history of a child's life in reality is. He had no intention whatever of urging that either parents or teachers should use psychoanalysis, as such. He did, however, desire that physicians should study this important subject, and that through them a better knowledge of the psychology of childhood should gradually spread among the members of the community at large.

Dr. Adolf Meyer said that since the term psychoanalysis seems to make some people very uneasy, we might discuss whether or not we recognize any biological effects of experience on individual life. We might try to find out what experiences, in children or adults, go with fairly regular effects. If that is the issue, no matter whether we choose the doctrine of Freud or that of simple common sense, it will dictate that which both Dr. Southard and Dr. Putnam probably had in mind.

STUDY OF A CASE OF THE ADULT TYPE OF POLIOMYELITIS
AND OF A CASE OF ACUTE ASCENDING PARALYSIS
OF THE TYPE OF LANDRY

By H. C. Gordinier, M.D.

Case 1 was one of rapidly ascending motor paralysis of the type of Landry, which began suddenly in the muscles of the lower extremities, involving in turn the muscles of the trunk, upper extremities and diaphragm; resulting in death from respiratory paralysis eight days from onset. Necropsy revealed no macroscopic changes. Microscopically degenerative changes were found confined to cells of the ventral cornua and intermediate gray, together with small capillary hemorrhages. No perivascular round celled infiltration was observed.

Case 2 was one of acute poliomyelitis in a young adult, involving the muscles of both upper extremities and those of the left lower. Right lower extremity was uninvolved. Death occurred in five days from respiratory failure. Necropsy revealed vascularity of pia-arachnoid of brain and cord and intense vascularity of the spinal gray. Microscopically remarkable degeneration of the anterior horn cells was found and the characteristic small mononuclear perivascular cell infiltration of the vessels of the cord, oblongata and motor cortex.

Dr. E. W. Taylor said the question is largely one of classification. Dr. Gordinier, in his paper, referred to the older classification, which seems to be unjustified on the whole in the present state of our knowledge. If we are to use the term "Landry's paralysis," it seems incumbent upon us to accept the criteria which Landry, in his original publication, set forth as typical of the syndrome which he described. One of these was that no pathological changes were found post mortem. Dr. Gordinier has described a distinct lesion of certain of the nerve cells in the cord. As our knowledge has progressed, it has become increasingly evident that the broad group of conditions which may best be included under the term "poliomyelitis" show varying pathological changes, exactly in the same way that the clinical manifestations are now recognized to be of most varied character. It therefore seems justified in the present state of our knowledge to include the so-called Landry's paralysis among the manifestations of poliomyelitis. In fact, this type, usually fatal, especially in adults, has now been generally recognized, so that it is customary to speak of the ascending, or Landry's type of poliomyelitis. Some years ago, Thomas, Spiller, and Bailey all reported cases which clinically were examples of Landry's paralysis, but which pathologically from their own description, were unquestionably poliomyelitis. The burden of proof at present seems to be upon those who claim that Landry's paralysis is a distinct entity.

Dr. Sachs said that Dr. Gordinier's paper has been most instructive and particularly interesting to those who for a number of years have been puzzled to know what role to assign to what has been called or considered Landry's paralysis. Dr. Sachs rose to speak on this subject because some experiences this year had thrown a strong light upon the question as to whether Landry's paralysis is or is not to be relegated to the dominion of poliomyelitis. The conclusion that he had reached, and he thought those associated with him had reached, is that for the present we must assume one of two things, either we are going to allow Landry's paralysis to designate a mere clinical form of ascending paralysis or we must conclude that what Landry originally described as an ascending paralysis may be due to

a number of morbid processes. Great difficulty exists in attempting to assign any one pathologic change as the sole cause of what is known as Landry's paralysis. It would be better to use the term in a purely clinical discussion as indicating an ascending paralysis.

During the past winter in the private infirmary service at Mount Sinai Hospital, a number of cases of marked infectious myelitis had been observed, involving all of the extremities. In three of these four cases recovery occurred, one resulted fatally. Every possible attempt had been made in these fatal cases to get at the etiological factor, and they had failed to the present time, by inoculation, and by other biological methods, to prove the nature of this infectious rapidly ascending and fatal myelitis.

Dr. E. E. Southard said in connection with the points raised by Dr. Gordinier, he would say that in the Harvard Neuropathological Laboratory, the late Dr. Emma W. Mooers studied both human and monkey tissues in poliomyelitis. She was able to show in experimental material of Drs. R. B. Osgood and W. P. Lucas that monkeys could show neuritis without poliomyelitis when infected with the Flexner virus. Dr. Mooers made finical search into the tissues by extensive teased preparations and appropriate extensive sections of the cords and brains. One case which showed such neuritis failed altogether to show either lymphocytosis or hemorrhage in the nervous system in any one of the exceedingly numerous portions examined; yet that monkey had been infected with tissue derived from a monkey which did show characteristic lymphocytosis and hemorrhage in the central nervous system and material from the spinal cord of this neuritic monkey yielded characteristic lymphocytosis and hemorrhage in a third monkey.

Dr. Gordinier in reply to the question of Dr. Taylor stated that the pathology of poliomyelitis is definitely understood, the characteristic changes being a mononuclear round cell infiltration of the pia and vascular walls. This change may be beautifully demonstrated by many of the simple stains, more notably hematoxylin and eosin, as shown in several of the photographs here presented. It seemed to Dr. Gordinier therefore that if Landry's disease is nothing more or less than the adult type of poliomyelitis the older observers of the Landry symptom complex would have discovered these cellular changes as all of the simple stains and especially hematoxylin and eosin were well known to them.

In reference to Dr. Spiller's question he would state that he did not examine the finer intra-muscular nerves. The ulnar and crural nerves were found normal.

(To be continued)

Periscope

Review of Neurology and Psychiatry

(Vol. XI, No. 8)

1. Clinico-Pathological Findings in Syphilis of the Central Nervous System. W. H. HOUGH.
2. A Case with Transient Attacks of Paralysis: Autopsy. W. K. HUNTER, and M. E. ROBERTSON.

1. *Syphilis of the Central Nervous System.*—A correct ante-mortem diagnosis can be made in 98 per cent. of cases of general paresis and about 85 per cent. of cases of syphilis of the nervous system. The most practical laboratory tests are: The estimation of the protein content of the cerebro-spinal fluid; the cell estimation of the c. s. f.; the Wassermann reaction of the c. s. f.; the Wassermann reaction with the blood serum. The lutein cutaneous reaction of Noguchi, and the provocative Wassermann reaction are of great value also under certain circumstances. The writer had examined 650 specimens of spinal fluid and 3,000 Wassermann reactions including 225 cases of g. p. and 100 cases of syphilis of the nervous system. The several tests are considered briefly individually in relation to results obtained. In conclusion the writer stated that we have no very great difficulty when all the tests can be applied and repeated if necessary in deciding whether a given case belongs to the syphilis-parasyphilis group, but we have difficulty in differentiating within this group. We cannot lay down any very definite rule concerning the reactions as a whole. We are only beginning to learn the relative value of the many combinations of reactions met with in various conditions, and it behooves us to study them carefully in as many cases and in as great a variety of conditions as possible. Some years ago 25 per cent. of our cases of paresis were not properly diagnosed, as shown by histological examination, whereas now we rarely fail to diagnose this condition. We still find, however, that the diagnosis of paresis is sometimes made where paresis does not exist. In such errors the correct diagnosis generally proved to be cerebral syphilis. When the clinician now fails to diagnose paresis in cases where the laboratory tests have been applied, as sometimes occurs in the early stages of the disease when the symptoms are not definite, there is reason to believe that the error is due in part at least to misinterpretation of the tests, especially the Wassermann reaction in the spinal fluid. The writer has known instances where the clinical symptoms were quite definite for paresis, but the diagnosis of cerebral syphilis was made because the Wassermann reaction in the fluid was negative or partial. We should bear in mind that about 20 per cent. of our cases of paresis show a negative Wassermann in the spinal fluid.

The various tests are to be looked upon as the property of the clinic—they are indispensable in the clinic, and it is essential that the clinician understands their proper meaning as far as is known.

2. *A Case with Transient Attacks of Paralysis: Autopsy.*—Man, 55, engineer, right hemiplegia and dysarthria. Recovery from right hemiplegia in six months. Admitted to hospital for dysarthria. After admis-

sion, had repeated (22) attacks of left hemiplegia with bulbar symptoms and urinary incontinence, and died at the end of a fortnight. The autopsy findings are stated and illustrated.

The actual cause of death seemed to be paralysis of the respiratory apparatus, and this was probably due to narrowing of the vessels at the base of the brain interfering with the circulation of the bulb. Transient spasm of these sclerosed vessels was probably also the cause of the seizures of cyanosis and stertorous breathing noted on 6th February. That there had been some involvement of the circulation of the bulb was shown at the autopsy, in the presence of a small softening about the center of the pons.

The symptoms otherwise seem to have been determined by the lesions in the internal capsules. The recurring attacks of left-sided hemiplegia were presumably caused by transient spasm of the branches supplying the right internal capsule, and when occlusion of these vessels ultimately became permanent, softening of the capsule supervened, with the persistent hemiplegia noted. That this softening was recent was shown by the almost complete absence of degeneration in this motor pathway, even with the Marchi method of staining.

The right-sided hemiplegia which came on twelve months prior to admission to hospital was explained by an older lesion in the left internal capsule. The softening must have involved chiefly the fibers going to the bulb, for the descending degeneration was much more marked in the crus and pons than in the medulla, and it was scarcely noticeable in the motor pathway in the cord. The very complete recovery, too, of the right arm and leg, with the absence of Babinski's signs, was also explained by the lesion limiting itself mainly to the bulbar fibers. The disturbance of articulation which was present on admission was probably of the nature of a dysarthria, due to the lesion in the anterior part of the posterior limb of the left internal capsule. But the defect of articulation varied from day to day, and it may, therefore, have some relationship to the softening in the lenticular nucleus, for this variability in speech has been noted in other cases of lenticular degeneration.

There was probably also some interruption of a proportion of the fibers of the anterior limb of this left internal capsule, for with the Marchi staining degenerate fibers were found in crus to extend quite to the inner limit of the pyramidal fibers.

The recurring attacks of complete loss of speech which accompanied the recurring attacks of left-sided hemiplegia must have been of the nature of a pseudo-bulbar paralysis. That is to say, there was a permanent lesion in the bulbar fibers of the left internal capsule, and an intermitting (ischemic) affection of the corresponding fibers in the right capsule. When the left-sided hemiplegia became permanent, so did the loss of speech, as well as the other bulbar symptoms. It is true that the softening which produced this hemiplegia did not seem to extend quite to the genu of the right internal capsule, but nevertheless the function of the bulbar fibers must have been disturbed by the lesion in their near neighborhood. Also, if we take the distribution of the degenerate fibers in the left internal capsule as some indication of the disposition of the bulbar fibers in the capsule it is apparent that they extend over an area which extends much further back to the genu.

It is interesting to note that at the time when the bulbar paralysis seemed complete, when the patient could not voluntarily open his mouth, or move his lips or tongue, that with an automatic movement like yawning

the mouth was opened wide and the lips much retracted. Probably such automatic movements are initiated in the central ganglia, being quite independent of the cerebral cortex.

The involuntary emptying of the bladder during the recurring attacks of hemiplegia with bulbar symptoms, in spite of the fact that the patient remained fully conscious, is of interest, in that polyuria and incontinence of urine have been not infrequently met with in cases of pseudo-bulbar paralysis. It is to be noted, too, that the bladder trouble persisted after the pseudo-bulbar symptoms became permanent.

C. E. ATWOOD (New York)

(Vol. XI, No. 9)

1. Remarks upon the Irregular and Unusual Types of Familial Periodic Paralysis and Conditions Simulating the Same, with a Preliminary Report upon a New Sub-Type of this Palsy. L. PIERCE CLARK.
2. Myasthenia Gravis with Exophthalmic Goitre. G. E. RENNIE.

1. *Familial Periodic Paralysis*.—The author states that none of his cases forming a possible sub-type of periodic paralysis showed any of the marked symptoms of that disease. His material was drawn from a known family stock of four generations, of nineteen members, in which nine members have shown a transient motor palsy or "inhibition disorder," without electrical changes or alterations in the reflexes, muscle tonus, or sensibility; but with occasional involvement of the cranial nerves. The disorder is independent of a psychosis. There were no autopsies of cases.

2. *Myasthenia Gravis*.—The patient was a married woman of 38. The onset of her symptoms was as follows: exophthalmos; weakness of the right hand and arm after five months; goitre. Examination showed presence of myasthenia as shown by the speech, the weakness of neck and arm muscles and characteristic electrical reaction. The plantar reflex was extensor both sides. Attacks of dyspnea came on in the hospital in which finally the intercostal muscles and diaphragm became inactive and death occurred.

C. E. Atwood.

Allgemeine Zeitschrift für Psychiatrie

(1913, Band LXX, Heft 2)

1. The Relation of Manic-Depressive Insanity to Somatic Diseases. M. ROSENTHAL.
2. Stigmata of Degeneration (in the Iris, Ear, Teeth, etc.) in Healthy Persons, the Insane, Epileptics, and Idiots. RUDOLF GAUTER.
3. Pseudoneuritis of the Optic Nerves, Especially in the Insane. HERMANN GIESE.
4. Disturbances of Musical Reproduction in Schizophrenia. ANDRÉ RÉPOND.
5. The White Blood Cells in Epilepsy. WILHELM RIEBES.
6. Experiments in Opsonogen. W. HEISE.

Manic-depressive Insanity and Somatic Diseases.—A review of opinions as to the relation of various diseases, particularly those of the circulatory system, of the glands with internal secretion and those of the vege-

tative nervous system to states of excitement and depression, as expressed in the more recent literature. The relations between many organs of the body and the nervous system are very intimate and manifold and we are scarcely yet in a position to understand them at all clearly, hence the possibility of separating out of the great group of the manic-depressive psychoses still other groups, on the ground of their pathogenesis, is not yet exhausted. Numerous references are given.

Stigmata of Degeneration.—The author examined for anomalies of pigmentation of the iris, 771 school children, 259 epileptics, 77 idiots, 466 insane patients and 34 normal adults, for anomalies in shape and position of the external ear and for anomalies in dentition, 742 school children, 259 epileptics, and 100 idiots. He concludes that there are none of the slighter signs of degeneration and probably none of the more severe ones which cannot be found also in healthy people. However, anomalies in the pigmentation of the iris occur in epileptics, idiots and insane persons from 6 to 10 times as frequently as in healthy persons. Signs of degeneration in the ear are found 6 to 8 times as frequently in epileptics as in healthy persons, 97 per cent. of idiots show signs of degeneration in the formation of the jaws and in their dentition. Since most of these anomalies depend upon rachitis this disease possesses a considerable importance in the pathology of idiocy. As to the frequency of the slighter signs of degeneration, this varies between epileptics and healthy school children, though in general the scholars are to a less extent affected by them.

Pseudoneuritis of the Optic Nerve.—This phenomenon has been described by Nottbeck as follows: "A more or less washed out appearance of the papillary borders" which is most marked on the nasal, next on the inner and outer border, and least in the neighborhood of the macula . . . radial striation of the papilla and of its blurred outlines often varying in degree . . . an "apparent hyperemia" which is accompanied by a grayish red coloration, now and then by tortuosity of the vessels.

Changes of this character were found by the author in 25 instances in a material of 290 cases all males and all but two insane. Of these 25 patients 18 were idiots or imbeciles, 4 schizophrenics, 1 manic-depressive, 1 arteriosclerotic and one pauper not insane. The high percentage of this anomaly among the defectives—15.9 per cent.—in proportion to that among the schizophrenics—3.48 per cent.—can hardly be accidental. Of the 168 insane patients whose mental trouble could not be referred to antenatal changes in the brain or to those arising in early childhood, only 6 showed "pseudoneuritis," and one of these and one of the paupers showed decided malformations so that there remained only 4 in which there was no evidence of congenital degeneration. Hence since this anomaly of the optic nerve head occurred four or five times as frequently in insane patients whose insanity appeared to depend upon a recognizable disturbance in the development of the brain, as in others in whom the mental disturbance was due to acquired factors, the author thinks that this pseudo-optic neuritis is not an accidental phenomenon but should be considered as a malformation, a stigma of degeneration.

Disturbances of Musical Reproduction in Schizophrenia.—It has long been known that psychotic persons who can still be induced to play music show certain changes from their former methods and make certain errors. The author has attempted to test whether or not the more or less specific disturbances in the affective, the intellectual and the psychomotor sphere in dementia præcox are manifested in any characteristic manner in music. His method consisted in having the patient under examination play or sing

before him, first from memory and then from the notes, some simple pieces of music suited to his capacity, preferably something which he had learned before coming to the asylum. The violin, the piano and the voice were alone utilized, the patients who could play the zither and harmonica being found unsuitable for testing. In some instances an attempt was made experimentally to bring the patient into a certain affective condition in order to note if his music showed any emotional reaction. In all 16 cases were examined, 14 precocious dementers, 1 epileptic and 1 manic-depressive. The author acknowledges the insufficiency of his material and also states that few of his patients were from the more educated classes. It was noticed that to many schizophrenics it appeared indifferent what they played and their execution seemed in no way to depend upon the affective condition at the time. The author sums up his conclusions as follows. All the schizophrenics examined showed disturbances of their musical expression of feeling and also of the musical feeling itself. Severe cases played with entire indifference as if they were executing a mechanical task. In consequence of this indifference they made various technical mistakes. Other things being equal their technical performances are in direct relation to their attentiveness. The feeling lacking was often replaced by mannerisms. Ability to "feel musically" is however not lost in schizophrenics and may appear under favorable conditions. Besides monoideism, lingering on certain notes, perseveration, he could find no important intellectual disturbances in their reproduction of music. The "flight of melodies" may be referred to lack of attention as is also sometimes refusal to play. Negativism also manifests itself in the playing of the patient.

In the musical course of ideas, we find the same fragmentation as in the intellectual, further monoideism, and perseveration to musical verbigeration. Besides the schizophrenic disturbance of attention makes itself felt in plainly apparent but not in characteristic manner.

In musical productions negativism may find expression as in all other acts. The disturbances of dementia præcox in the affective, intellectual and psychomotor sphere manifest themselves in characteristic fashion, in music.

White Blood Cells in Epilepsy.—Examinations of the blood before and after the epileptic attack were made. Before the attack the neutrophile polynuclear cells and the large mononuclear leucocytes were increased from 15 per cent. to 20 per cent. while the lymphocytes were correspondingly diminished. After the attack the lymphocytes rise to the normal again, in a few cases slightly above it, while the polynuclear neutrophiles and the large mononuclear leucocytes fall to normal or slightly below. The author compares the conditions with lymphocytosis and leucocytosis from other causes.

Experiments with Opsonogen.—Description of the treatment of furunculosis in the insane with some staphylococcus vaccines. Of no special psychiatric interest.

C. L. ALLEN (Los Angeles).

MISCELLANY

PARAPHRENIA. M. J. Karpas. (J. A. M. A., Aug. 29, 1914.)

Kraepelin's conception of paraphrenia which forms a subgroup of endogenous dementia is here outlined by Karpas. In some respects it may simulate dementia præcox but the characteristic disturbances of motion and volition to the extent of bringing about disintegration of personality

are lacking. Some abnormal emotional activity may appear but striking apathy and indifference are absent and the general conduct is influenced by abnormal thought processes and not by volitional disturbances. Its etiology is not definitely known and there is no specific type of heredity. It occurs in both sexes, but the expansive form is met with only in women. The characteristic type of personality is not determined. The development is gradual, the course progressive and it usually ends in a state of psychic enfeeblement. He divides it into four large groups. (1) systematized, (2) expansive, (3) confabulatory, and (4) fantastic. Each of these types is described in detail. As regards diagnosis between systematized paraphrenia and true paranoia of Kraepelin the former is considered a disease process, the latter more of a psychic malformation. Compare Singer's article on Dementia Præcox in the June number of this JOURNAL.

HYPERTHYROIDISM. S. P. Beebe. (J. A. M. A., Aug. 29, 1914.)

The relations of pathologic conditions in the nose and throat to the origin and treatment of hyperthyroidism is the subject of this article by Beebe. He first notices the theories of the internal secretion and its functions and shows how experiments and clinical observations have demonstrated its antitoxic actions and protection against various pathologic conditions. The relation of thyroid disease to previous infections has been noted clinically by many observers. The terminal event in hyperthyroid patients is often an infection which has begun in the tonsils, and Beebe says that he has not seen a necropsy in these cases which did not disclose the characteristic pathology of status lymphaticus. He also mentions the common occurrence of hyperthyroidism in women and its relation to the function of the sex-glands as bearing on this question. A large percentage of patients with exophthalmic goiter have enlarged tonsils and adenoids, and give a history of repeated attacks of acute tonsillitis. It is not uncommon for them to date the beginning of the goiter to one of these. Infections of the nose and throat are undoubtedly the commonest to which man is subject, and many of our ills might, if one was so disposed, be credited to them. Recent experiments as to the specific infection of hyperthyroidism are mentioned by Beebe and he says if the thyroid secretion is an important element against infections it is not impossible that it is stimulated to over-activity when occasion calls for it and if this is too often repeated the gland may become enlarged and a pathologic condition induced. It is not a rare thing to find that a rapid enlargement of the thyroid with characteristic symptoms of over-activity has immediately followed a particularly severe tonsillar infection. Such patients bear these infections badly; are prostrated and slow in getting well. In exophthalmic patients there is no more dangerous or troublesome factor than the tonsil infections to which they are liable and they should be carefully guarded against them. If the patient's condition permits, tonsils and adenoids should be removed. This should not be done, however, during active thyroid intoxication without appreciating the fact that these patients bear operations badly, and every precaution should be taken to avoid shock. It becomes at times more important in exophthalmic goiter when considering operation to first attend to the infected areas. Beebe says that every young patient with an enlarged thyroid should have a careful examination of the nose and throat and the converse is equally true. Between the age of twelve and twenty is the beginning point of most thyroid enlargements and it has been his observation that the combination of enlarged tonsils and adenoids, gastric disturbances and constipation and

an enlarged thyroid is the beginning of the condition which does not usually attract much attention unless the patient is annoyed by the cosmetic defect in the neck. Hyperthyroidism can be checked in such patients before serious damage is done if its beginnings can be recognized. Too frequently it is overlooked.

HEREDITY IN MAN. William Bateson. (The Lancet, Aug. 22, 1914.)

In his presidential address before the meeting of the British Association for the Advancement of Science, speaking of Biology and Schemes for Reform, Bateson remarks that in all practical schemes for social reform the congenital diversity, the essential polymorphism of all civilized communities must be recognized as a fundamental fact, and reformers should rather direct their efforts to facilitating and rectifying class-distinctions than to any futile attempt to abolish them. The teaching of biology is perfectly clear. We are what we are by virtue of our differentiation. The value of civilization has in all ages been doubted. Since, however, the first variations were not strangled in their birth, we are launched on that course of variability of which civilization is the consequence. We cannot go back to homogeneity again, and differentiated we are likely to continue. For a period measures designed to create a spurious homogeneity may be applied. Such attempts will be made when the present unstable social state reaches a climax of instability, which may not be long hence. Their effects can be but evanescent. The instability is due not to inequality, which is inherent and congenital, but rather to the fact that in periods of rapid change like the present, convection currents are set up such that the elements of the strata get intermixed and the apparent stratification corresponds only roughly with the genetic. In a few generations under uniform conditions these elements settle in their true levels once more. In such equilibrium is content most surely to be expected. To the naturalist the broad lines of solution of the problems of social discontent are evident. They lie neither in vain dreams of a mystical and disintegrating equality, nor in the promotion of that malignant individualism which in older civilizations has threatened mortification of the humbler organs, but rather in a physiological coördination of the constituent parts of the social organism. The rewards of commerce are grossly out of proportion to those attainable by intellect or industry. Even regarded as a compensation for a dull life, they far exceed the value of the services rendered to the community. Such disparity is an incident of the abnormally rapid growth of population and is quite indefensible as a permanent social condition. Nevertheless, capital, distinguished as a provision for offspring, is a eugenic institution; and unless human instinct undergoes some profound and improbable variation, abolition of capital means the abolition of effort; but as in the body the power of independent growth of the parts is limited and subordinated to the whole, similarly in the community we may limit the powers of capital, preserving so much inequality of privilege as corresponds with physiological fact. At every turn the student of political science is confronted with problems that demand biological knowledge for their solution. Most obviously is this true in regard to education, the criminal law, and all those numerous branches of policy and administration which are directly concerned with the physiological capacities of mankind. Assumptions as to what can be done and what cannot be done to modify individuals and races have continually to be made, and the basis of fact on which such decisions are founded can

be drawn only from biological study. A knowledge of the facts of nature is not yet deemed an essential part of the mental equipment of politicians; but as the priest, who began in other ages as medicine-man, has been obliged to abandon the medical parts of his practice, so will the future behold the schoolmaster, the magistrate, the lawyer, and ultimately the statesman, compelled to share with the naturalist those functions which are concerned with the physiology of race.

JELLIFFE.

SENSORY LOCALIZATION OF THE CORTEX. C. T. Van Valkenburg. (*Zeits. f. d. g. Neurol. u. Psych.*, Vol. 24, Heft. 2, 3, 1914.)

It seems established that in man and the ape the excitable motor cortex is entirely in front of the fissure of Rolando, and that the postcentral gyrus does not contain motor centers that can be stimulated electrically. But the exact localization of sensation—*i. e.*, the area or areas of the cortex concerned with the reception and appreciation of stimuli underlying the different forms of sensibility—has been a puzzle to the physiologist and clinician. Despite innumerable observations, clinical and pathological, the matter is far indeed from being settled. Dr. van Valkenburg, has repeated the experiments of Cushing by investigating the phenomena during full consciousness of the patient. His first case was that of a boy of 16 who suffered from Jacksonian epilepsy beginning in the left hand, preceded by a definite sensory aura in the limb. A preliminary craniectomy was performed under ether, and six days later the wound was reopened under local anesthesia only. The patient felt no pain or other sensation when the dura mater was cut through. With suitable stimulation the motor center for the fingers was easily found, in the precentral gyrus. The postcentral gyrus was then stimulated and the patient was able to localize paresthesia without any hesitation at the left corner of his mouth, in the fore-finger, all four fingers, little finger, hypothenar eminence, wrist, and elbow respectively, as the observer moved the electrodes upwards over the gyrus. These spots correspond to—*i. e.*, were situated opposite—the respective motor centers in the precentral gyrus, from which no such paresthesia could be elicited by identical stimulation. The second case was that of a man of 25 who suffered from Jacksonian attacks on the right side, beginning usually at the corner of the mouth. They were preceded by a pricking sensation on the skin. In this case also the second stage of the operation was performed under local anesthesia only. The center for the corner of the mouth was localized on the precentral gyrus. Immediately opposite this spot, on the postcentral gyrus, stimulation evoked the same paresthesia which the patient had felt so often as the aura to his attacks, the pricking round the mouth. By careful adjustment of the electrodes the observer was able to elicit a similar sensation localized by the conscious patient in his upper lip, lower lip, both mesial and lateral separately, on skin between chin and corner of mouth, thumb, proximal phalanx of thumb, respectively. These experimental data are of very considerable value. They show that it is possible to produce paresthesia even in small areas of the contralateral skin by stimulation of the post-central gyrus, and that these cortical "centers" are opposite to and on the same horizontal level as the corresponding motor centers on the precentral gyrus. It is noteworthy that stimulation of the postcentral convolution does not produce a sensation of movement, but of "tingling," "pricking," "pins and needles." The parallelism between motor and sensory centers in the

adjacent central gyri thus receives additional confirmation. The investigation raises several questions of physiological and clinical importance. Among these may be mentioned that of a regional relationship between the skin and the cortical representation of the same, and that of the distribution of the varieties of sensibility in the cortex. As far as the latter is concerned, stimulation by the electric is no doubt a comparatively crude method, and it does not throw much light, perhaps, on the exact nature of the sensibility there localized. Available evidence at present, however, goes to suggest that there is a dissociation of sensibility in cortical lesions, and that touch, muscle sense, discrimination of compass points, stereognosis, and appreciation of warm and cool temperatures are apt to be lost, while pain and deep pressure (pressure-pain) may be preserved. There is also evidence to indicate that the segmentation of the skin of the body as represented in the spinal cord is re-represented in the cerebral cortex.

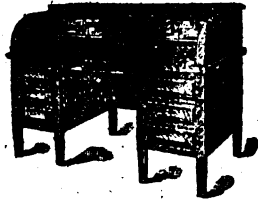
LESIONS OF THE BASE AND POLYURIA. J. Camus and G. Roussy. (*Comptes Rendues Soc. de Biol.*, 76, 1914, pp. 773, 877.)

These authors present a preliminary report of a series of experiments. The pathology of diabetes insipidus, they say, remains obscure, but there is some evidence that in certain of the cases there has been a lesion in the neighborhood of the hypophysis. This has been shown both by the growth anomalies allied to acromegaly which often accompany descriptions of diabetes insipidus cases, and also by the fact that in many cases there is some limitation of the field of vision, a state of affairs of frequent occurrence with pituitary lesions. In these experiments dogs were operated upon, and in different animals various portions of the brain were destroyed, and the effect upon the urine secretion was noted. The areas thus destroyed were those in the immediate vicinity of the hypophysis; in some animals the hypophysis was also destroyed, either at one operation or subsequent to a previous destruction of brain tissue. Some 18 animals were used. The important fact comes out that polyuria may result even when the lesion is not limited to the hypophysis. In five instances the experimental puncture did not touch the hypophysis, yet polyuria resulted. The type of polyuria thus produced differs in no respect from pituitary polyuria. There is a limited area of brain tissue, situated in the vicinity of the hypophysis, ablation of which induces polyuria. Anteriorly it appears to be bounded by the optic chiasma and posteriorly by the protuberance; the area exists in the vicinity of the infundibulum. An observation was that if the hypophysis were removed but the infundibulum preserved there was no polyuria. Basal destruction affecting this special area, following a previous hypophysis ablation, increased the degree of polyuria. The writers consider that this zone of tissue appears to regulate the retention of water in the organism. They found also that this mechanism was less perfect in young animals than in old. It is a function which seems to have some general controlling effect upon water retention, and which assumes a greater significance and value as age advances. It is possible that observations of this nature may aid in furnishing additional data for the localization of tumors of the base.

JELLIFFE.

T. G. SELLEW ROLL TOP DESKS

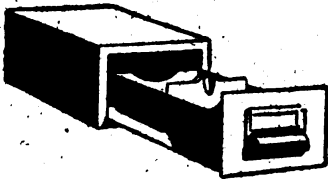
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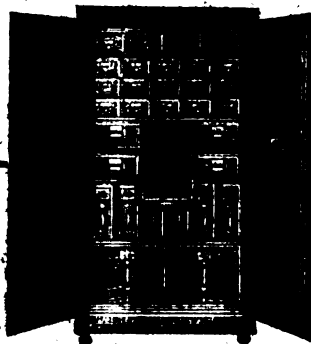
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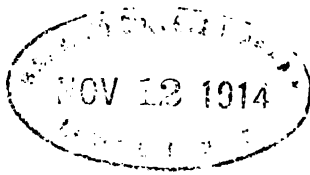
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The Journal OF Nervous and Mental Disease

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Original Articles

A NEW (FAMILIAL) FORM OF PROGRESSIVE SPINAL MYOPATHY

BY CHAS. L. DANA, M.D., LL.D.

PROFESSOR OF NEUROLOGY, CORNELL UNIVERSITY MEDICAL COLLEGE

The position nosologically and clinically of anterior poliomyelitis chronica (subacuta) is now fairly well-established. It is a disease which runs its course sometimes in less than a year, oftener in several years, hence it is generally chronic, but sometimes subacute. It almost always develops rather rapidly, showing distinct paralysis and later atrophy of certain muscle groups within a few weeks. It may then remain stationary for a few months to a year, and then come on again, attacking a new group of spinal cells. The paralysis distinctly precedes the atrophy; fibrillary tremor is not very marked; the reaction of degeneration becomes complete. The disease attacks one side of the cord, then the other, and does not develop bilaterally as in dystrophies. It has often a syphilitic origin, as I have shown.

It is not a hereditary disease, although two writers have reported cases of chronic poliomyelitis anterior occurring in father and son,¹ and there is the infantile familial type (Werdnig-Hoffmann) of chronic poliomyelitis.

I am not aware that there has been placed on record in literature any account of a familial form of chronic anterior poliomye-

¹ Poliomyelitis chronica (or subacuta) Brenning, Zeits. für Nervenheilk., Vol. 27, 1904, p. 269. A. Fuchs, Muscular Atrophy in Father and Son, Jahrb. für Psychiat., Vol. 31, 1910, p. 195.

litis, always beginning in the members after middle life. Hence I venture to report here a case of this kind occurring at the age of 53, in a family in which 10 cases were known to have developed in three generations.

I have no data by which to prove definitely that the lesion is an anterior poliomyelitis and it may well be that it is not strictly an inflammatory but rather a degenerative process. The clinical history shows that its course is like that of a disease which destroys one group of spinal motor cells one after another. It is not a slowly developing atrophy followed by paralysis, but a rather sudden paralysis followed by atrophy. The disease progresses and the patient dies in a period of about one year.

I have seen only one case and it is from this patient that I have obtained the history of nine other cases, showing that a trouble similar to her own had already run through three generations.

History.—The patient was a trained nurse, unmarried, fifty-three years of age. She had been well and active all her life. Her habits had been good and there was no history of alcohol, drugs, or lues. She came to me in April, 1913, with the history of having noticed a weakness in the left thigh, beginning in the previous January. This weakness of the thigh had slowly increased until when she came to me she walked with a distinct limp; she could step up stairs with difficulty and could only walk a few blocks because of sense of fatigue in the legs.

The examination showed that she had atrophy of the extensors of the left leg and that there was some atrophic weakness in the power of extending and flexing the left foot. She could, however, at that time, walk on her toes and on her heels, but could not step up a step of ordinary height and could not rise from a sitting position without helping herself with her arms. The measurements were, right thigh 43 centimeters; left 40 centimeters. Right calf, 33 centimeters; left 31. There was a distinct reaction of degeneration in the left quadriceps femoris. The right knee-jerk was present; the left knee-jerk was absent. Both ankle-jerks were absent. There was no ankle clonus and no extensor response, no cramp, or fibrillary tremor.

There was no anesthesia, either cutaneous or deep; but the patient had subjective sensations of twitching in the left thigh. There was no sphincter trouble. The nerves and muscles of the

trunk and upper extremities, and cranial nerves and their reflexes were all normal on my first examination.

The patient was sent to the Neurological Hospital where her blood was tested and found to be negative to Wassermann and normal as to cell count and hemoglobin.

The urine, heart and blood-pressure were also normal. The mental condition was also normal. In fact her self-control and placidity in view of the serious nature of the outlook were remarkable.

On May 20, in spite of tonics and various forms of electrical treatment she was found to be a little worse. She could not raise the leg quite as well; could not walk as far and she went up steps with greater difficulty. She felt well, ate and slept well, and was able to walk about two blocks. She had fallen down, however, several times.

On June 5, she had become still worse, both thighs showing more atrophy. There had now developed a little weakness in the fingers of the left hand. She has also some flickering of the extensor muscles of the thigh which was very annoying and which I took to be due to fibrillary twitchings, though I could not observe any. This same annoying flickering she said had bothered her mother a great deal.

Special electrical tests made on the muscles of the legs by Dr. Haigler of the Institute showed degenerative reactions partial or complete in the sartorius, quadriceps femoris, rectus femoris and vastus internus. Practically all the muscles of the left thigh were found to be diminished in electrical excitability. The left vastus internus showed partial R. D. and the vastus externus complete R. D.

She left the hospital at this time and went into the country. About a month later she wrote me that her arms were becoming weaker. I heard no more from her, but learned that she died on November 4, ten months after the beginning of her disease. As in the case of her mother there was finally a bulbar paralysis, I assume this patient must have died in the same way.

The family history, as I learned it from the patient, was as follows:

Her maternal grandmother had the same disease and died of it in her forty-first year. Maternal grandfather healthy. There were three children born by her mother. One died at birth and

one, a sister of the patient, died at forty-seven of gastric ulcer. Her mother died of this progressive paralysis at the age of forty-seven. In her case the disease began in the fingers and then went to the legs and throat and the whole trouble lasted a year.

The mother had three sisters who died of the same trouble, one at the age of fifty-two, one at forty-two, and one at thirty-seven. In two of these cases the trouble began in the arms and in one case in the legs. In all cases the disease progressed upwards.

The mother had a brother whose son developed the trouble at the age of thirty-five. She had two other sisters who did not have the disease, each married and had healthy children. Four are known to be living at ages of 50 to 60. In addition to this, three sons of the grandmother's sister died of the family disease.

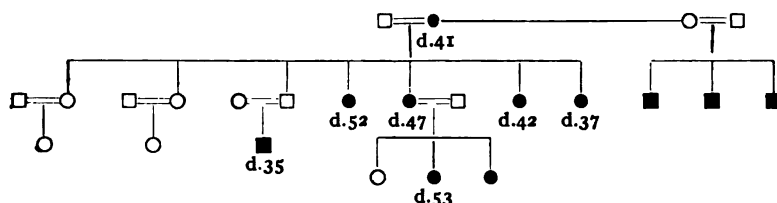


Chart showing genealogy of spinal myopathy.

The accompanying diagram shows the distribution of the cases in the family.

I would add that the family is of old American stock, coming from the State of New York.

I add here a table which may not be complete showing the familial diseases affecting the nervous system and muscles.

1. Dystrophies:

- (a) Pseudo-hypertrophy.
- (b) Juvenile type (Erb).
- (c) Leyden type.
- (d) Landouzy-Dejerine type.
- (e) Zimmerlin type.
- (f) Congenital type.
- (g) Pseudo-contracture type.

2. Primary nervous degenerations:

- (a) Charcot-Marie-Tooth type.
- (b) Werdnig-Hoffmann infantile type.

- (c) Bulbar type.
 - (d) Gombault-Mallet type.
 - (e) Eichhorst type.
 - (f) Adult type spinal myopathy (Dana).
3. Ptosis.
 4. Optic atrophy?
 5. Spastic types.
 - (a) Hereditary spastic paraplegia.
 6. Ataxic types.
 - (a) Friedreich's ataxia.
 - (b) Hereditary cerebellar ataxia.
 7. Transition forms between 5 and 6.
 8. Cerebral degenerations.
 - (a) Huntington's chorea.
 - (b) Progressive dementia without chorea (Dana).

We know that the muscles, the primary and secondary neurones, the cerebral and cerebellar association neurones may become affected by degenerative processes. All these processes, originally of accidental; toxic or infective origin, may, by a process of mutation (?), affect the germ plasm and cause a defect in the *anlage*. Posterior sclerosis, lateral sclerosis, poliomyelitis, cortical degenerations, polymyositis, thus become familial diseases.

In the present case there are not enough data to enable us to say how closely if at all this spinal myopathy follows Mendel's law. It seems, however, as if the disease was being crowded out by the death of the victims and the survival of the pure strains.

OBSERVATION UPON SPINAL FLUID CELL COUNTS IN UNTREATED CASES OF CEREBRO-SPINAL SYPHILIS¹

BY H. W. MITCHELL, M.D., IRA A. DARLING, M.D., AND
PHILIP B. NEWCOMB, M.D.

FROM THE WARREN STATE HOSPITAL, WARREN, PENNSYLVANIA

Following the adoption of the Swift-Ellis treatment in syphilis of the nervous system many contributors have referred to a reduction of the cell count following such treatment, and often the inference must be made that the reduction has been considered as an index to the value of treatment. The results of cell counting in our series of cases being treated by the Swift-Ellis method were so uncertain that it was determined to make some comparative counts at regular intervals upon untreated cases of paresis, to ascertain the extent of fluctuation in the pleocytosis. Such pronounced variations were found in individual cases that we finally included in the study all available cases of paresis exhibiting every stage of the disease. Some three hundred counts were made upon thirty-four patients, at intervals of two weeks. The Wassermann test upon the blood serum was positive in thirty-three cases, while in one case three trials gave negative results. The same test upon the fluid was positive at some time in all cases, while in three cases only did it, at any time, give faintly positive or negative results. The Noguchi butyric acid test for globulin was more variable and in fifteen cases it was positive, faintly positive and negative at different times.

The Wassermann and globulin tests were made upon the fluid with each cell count but the blood was examined but once in most of the cases. All of the patients were males and no cases presenting any doubt as to the correctness of the clinical diagnosis were included in our list.

All of the serological work and the cell counting was done by the hospital pathologist, Dr. Paul G. Weston, and the possible error due to the personal equation in counting was thus

¹ Read at the fortieth annual meeting of the American Neurological Association, May 7, 8 and 9, 1914.

reduced to a minimum by comparing the findings of one person in the various counts. The same technique was followed carefully in all instances. The fluid was drawn into a red-cell pipette at the bedside immediately following the puncture. Methyl violet in 36 per cent. acetic acid was used as the staining reagent and all counting was done within an hour from the time of puncture. Before counting the pipette was well shaken and five different drops were counted upon a Zappert-ruled Zeiss slide. The nine large squares were counted with each drop and the average count recorded for each puncture.

In compiling our results some cases showed increase in the count, others a decrease, while many remained practically unchanged. These varying results demonstrated little relation with the stage of the disease or the patients' condition while under investigation as can readily be seen by a review of the abstracts and tables.

TABLE NO. I

Slight Variation in Count

No. 1. S———. Case No. 8284. Age, 42 years.

History of syphilitic infection eight years previously. Duration of mental symptoms about two years. Diagnosis, tabo-paresis. Present condition comfortable with practical remission of active symptoms. Blood gave positive Wassermann on two trials. Fluid was positive fifteen times. Globulin, negative twice; positive thirteen times. Cells varied from none to twelve on fifteen counts.

No. 2. F———. Case No. 8298. Age, 36 years.

History of syphilitic infection nineteen years previously. Duration of mental symptoms about one year. Diagnosis, paresis. Present condition elated and mildly demented. Blood gave positive Wassermann on one trial. Fluid was positive thirteen times. Globulin, negative three times; positive ten times. Cells varied from eighty to three hundred on thirteen counts.

No. 3. S———. Case No. 7696. Age 38 years.

History of syphilitic infection thirteen years previously. Duration of mental symptoms about four years. Diagnosis, paresis. Condition, bedridden to time of death. Blood gave positive Wassermann on one trial. Fluid was positive eleven times. Globulin, negative seven times; positive three times. Cells varied from none to two on twelve counts.

No. 4. L———. Case No. 7796. Age, 42 years.

No history of syphilitic infection. Duration of mental symptoms about five years. Diagnosis, tabo-paresis. Present condition well nourished, demented, bedridden patient. Blood gave positive Wassermann on two trials. Fluid was positive six times, faintly positive or negative on last tests. Globulin, negative nine times; positive two times. Cells varied from none to twenty on eleven counts.

No. 5. F———. Case No. 8303. Age, 75 years.

Questionable history of syphilitic infection. Duration of mental symptoms about thirteen years. Diagnosis, paresis. Condition, bedridden to time of death. Blood gave positive Wassermann on one trial. Fluid was positive eleven times. Globulin, positive eleven times. Cells varied from none to fifteen on eleven counts.

No. 6. D———. Case No. 8184. Age, 49 years.

History of syphilitic infection twenty years previously. Duration of mental symptoms about ten years. Diagnosis, tabo-paresis. Condition, helpless and bedridden to time of death. Blood gave positive Wassermann on one trial. Fluid was positive ten times. Globulin, negative nine times, positive once. Cells varied from one to one hundred on ten counts.

No. 7. P———. Case No. 8361. Age, 42 years.

No history of syphilitic infection. Duration of mental symptoms about one year. Diagnosis, tabo-paresis. Present condition, fair remission of active symptoms. Blood gave positive Wassermann on one trial. Fluid was positive ten times. Globulin, positive ten times. Cells varied from none to ten on ten counts.

No. 8. M———. Case No. 7886. Age, 62 years.

History of syphilitic infection thirty-four years previously. Duration of mental symptoms about four years. Diagnosis, tabo-paresis. Condition, bedridden and helpless to time of death. Blood gave positive Wassermann on one trial. Fluid was positive seven times. Globulin, positive seven times. Cells varied from one to twenty on seven counts.

No. 9. P———. Case No. 8483. Age, 64 years.

No history of syphilitic infection. Duration of mental symptoms about one year. Diagnosis, paresis. Present condition, feeble, demented and euphoric. Blood gave positive Wassermann on one trial. Fluid was positive six times. Globulin, positive six times. Cells varied from none to two on six counts.

No. 10. B———. Case No. 8490. Age, 51 years.

No history of syphilitic infection. Duration of mental symptoms about two years. Diagnosis, paresis. Present condition, ambulant with mild degree of euphoric dementia. Blood gave positive Wassermann on one trial. Fluid was positive five times. Globulin, positive five times. Cells varied from none to one hundred on five counts.

Continuous low counts, with little variation, are found in tabo-paresis with remission (Case I), in bedridden and dying patients (Cases Nos. III, IV, V and VIII), also in a rapidly deteriorating grandiose parietic (No. IX). Of the three cases with relatively high count, one (Case No. VI) was a tabo-parietic with optic atrophy, bedridden to time of death, while the other two are cases of advancing paresis with well pronounced grandiose symptoms.

TABLE NO. II

Decrease in Count

No. 1. A———. Case No. 8084. Age, 36 years.

History of syphilitic infection thirteen years previously. Duration of mental symptoms about two years. Diagnosis, tabo-paresis. Present condition, remission of active symptoms. Blood gave positive Wassermann on one trial. Fluid was positive thirteen times. Globulin, negative ten times; positive three times. Cells varied from none to two hundred and sixty on thirteen counts.

No. 2. A———. Case No. 8191. Age, 39 years.

History of syphilitic infection twelve years previously. Duration of mental symptoms about one year. Diagnosis, paresis. Present condition, active and strong but shows considerable slowly progressive deterioration. Blood gave positive Wassermann on one trial. Fluid was positive eleven times. Globulin, negative once; positive nine times. Cells varied from none to eighty on eleven counts.

No. 3. B———. Case No. 7747. Age, 47 years.

No history of syphilitic infection. Duration of mental symptoms unknown. Diagnosis, cerebro-spinal syphilis (hemiplegia). Present condition, bedridden and demented. Blood gave positive Wassermann on one trial. Fluid was positive ten times. Globulin, positive ten times. Cells varied from none to one hundred and forty on ten counts.

No. 4. S———. Case No. 8075. Age, 34 years.

No history of syphilitic infection. Duration of mental symptoms about three years. Diagnosis, paresis. Condition, bedridden and demented to time of death. Blood gave positive Wasser-

mann on one trial. Fluid was positive seven times. Globulin, positive seven times. Cells varied from none to fifty on seven counts.

No. 5. A———. Case No. 7528. Age, 41 years.

No history of syphilitic infection. Duration of mental symptoms about three years. Diagnosis, paresis. Condition, bedridden and demented to time of death. Blood gave positive Wassermann on one trial. Fluid was positive eight times. Globulin, negative five times; positive twice. Cells varied from none to thirteen on seven counts.

No. 6. B———. Case No. 8401. Age, 45 years.

No history of syphilitic infection. Duration of mental symptoms about four years. Diagnosis, paresis. Present condition, advanced dementia. Ambulant. Blood gave positive Wassermann on one trial. Fluid was positive seven times. Globulin, positive seven times. Cells varied from one to forty on six counts.

No. 7. R———. Case No. 8435. Age, 47 years.

History of syphilitic infection seven years previously. Duration of mental symptoms about four years. Diagnosis, paresis. Present condition, demented and helpless. Ambulant. Blood gave positive Wassermann on one trial. Fluid was positive six times. Globulin, negative once; positive, five times. Cells varied from two to thirty on six counts.

No. 8. W———. Case No. 8149. Age, 34 years.

History of syphilitic infection ten years previously. Duration of mental symptoms about five years. Diagnosis, cerebral syphilis with optic atrophy. Present condition, blind, slightly unreasonable, ambulant. Now at home. Blood gave positive Wassermann on one trial. Fluid was positive six times. Globulin, positive six times. Cells varied from three to one hundred on six counts.

No. 9. H———. Case No. 7597. Age, 40 years.

No history of syphilitic infection. Duration of mental symptoms about four years. Diagnosis, paresis. Present condition, active and grandiose. Shows little dementia. Blood gave positive Wassermann on three trials. Fluid was positive five times. Globulin, negative three times; positive twice. Cells varied from none to sixty on five counts.

No. 10. McK———. Case No. 7811. Age, 42 years.

History of syphilitic infection seventeen years previously. Duration of mental symptoms about two years. Diagnosis, paresis. Condition, feeble and demented to time of death. Blood

gave positive Wassermann on two trials. Fluid was positive five times. Globulin, positive five times. Cells varied from one to six on four counts.

No. 11. C———. Case No. 7249. Age, 47 years.

No history of syphilitic infection. Duration of mental symptoms about four years. Diagnosis, paresis. Present condition, ambulant and much demented. Blood gave positive Wassermann on one trial. Fluid was positive three times, faintly positive four times and negative six times. Globulin, negative once; positive eleven times. Cells varied from none to one hundred and ten on thirteen counts.

No. 12. W———. Case No. 8136. Age, 32 years.

History of syphilitic infection eleven years previously. Duration of mental symptoms about three years. Diagnosis, paresis. Present condition, ambulant and much demented. Blood gave positive Wassermann on one trial. Fluid was positive eleven times. Globulin, positive eleven times. Cells varied from none to twenty-five on eleven counts.

No. 13. C———. Case No. 8359. Age, 40 years.

No history of syphilitic infection. Duration of mental symptoms unknown. Diagnosis, paresis, with optic atrophy. Present condition, feeble and profoundly demented. Ambulant. Blood gave positive Wassermann on one trial. Fluid was positive eight times, faintly positive twice and negative once. Globulin, positive ten times. Cells varied from none to one hundred and twenty on eleven counts.

No. 14. O———. Case No. 8180. Age, 36 years.

No history of syphilitic infection. Duration of mental symptoms about five years. Diagnosis, paresis. Present condition, ambulant but showing much dementia. Blood gave positive Wassermann on one trial. Fluid was positive ten times. Globulin, positive nine times. Cells varied from none to seventy on ten counts.

No. 15. B———. Case No. 7985. Age, 60 years.

History of syphilitic infection seven years previously. Duration of mental symptoms about two years. Diagnosis, paresis. Condition, bedridden to time of death. Blood gave positive Wassermann on one trial. Fluid was positive nine times. Globulin, negative once; positive eight times. Cells varied from one to one hundred and ten on nine counts.

No. 16. J———. Case No. 8385. Age, 32 years.

History of syphilitic infection eleven years previously. Dura-

TABLE II

[illegible]

tion of mental symptoms about two years. Diagnosis, paresis. Condition, ambulant and progressively deteriorating to a few days before death following epileptiform seizures. Blood gave positive Wassermann on one trial. Fluid was positive eight times. Globulin, positive eight times. Cells varied from none to one hundred on eight counts.

No. 17. D———. Case No. 8271. Age, 48 years.

No history of syphilitic infection. Duration of mental symptoms about three years. Diagnosis, paresis. Condition, bedridden to time of death. Blood gave positive Wassermann on one trial. Fluid was positive seven times. Globulin, negative once; positive six times. Cells varied from none to one hundred and sixty on seven counts.

No. 18. N———. Case No. 8439. Age, 40 years.

History of syphilitic infection eighteen years previously. Duration of mental symptoms about three years. Diagnosis, tabo-paresis. Present condition, ambulant and much demented. Blood gave positive Wassermann on one trial. Fluid was positive seven times. Globulin, positive seven times. Cells varied from two to one hundred and thirty on seven counts.

No. 19. B———. Case No. 7857. Age 60 years.

No history of syphilitic infection. Duration of mental symptoms unknown. Diagnosis, tabo-paresis. Condition, bedridden and demented to time of death. Blood gave positive Wassermann on one trial. Fluid was positive five times. Globulin, negative once; positive four times. Cells varied from none to fifty on five counts.

The decrease in count is seen in both the early and late stages, and in all possible terminations of the disease, and seems to bear little relation to the clinical condition. High counts were seen in periods of comparative remission, and both high and low counts were found in far advanced, dying cases.

TABLE NO. III

Increase in Count

No. 1. M———. Case No. 8014. Age, 46 years.

History of syphilitic infection twenty-two years previously. Duration of mental symptoms about three years. Diagnosis, paresis. Present condition, advanced and failing. Blood gave positive Wassermann on one trial. Fluid was positive eleven times. Globulin, positive eleven times. Cells varied from twenty to one hundred and sixty on eleven counts.

No. 2. Y———. Case No. 7117. Age, 54 years.

No history of syphilitic infection. Duration of mental symptoms about five years. Diagnosis, paresis. Condition, bedridden

to time of death. Blood gave positive Wassermann on first trial. Fluid was positive eight times. Globulin, negative five times; positive twice. Cells varied from two to fifteen on eight counts.

No. 3. G———. Case No. 8479. Age, 38 years.

History of syphilitic infection three years previously. Duration of mental symptoms about one year. Diagnosis, paresis. Present condition, feeble and demented, showing slight improvement. Blood gave positive Wassermann on one trial. Fluid was positive six times. Globulin, positive six times. Cells varied from none to thirty on six counts.

No. 4. W———. Case No. 8500. Age, 40 years.

No history of syphilitic infection. Duration of mental symptoms about two years. Diagnosis, tabo-paresis. Present condition, progressive. Blood gave positive Wassermann on one trial. Fluid was positive five times. Globulin, positive five times. Cells varied from two to sixty on five counts.

No. 5. H———. Case No. 8349. Age, 32 years.

No history of syphilitic infection. Duration of mental symptoms about five years. Diagnosis, paresis. Present condition, advanced, but showing slight clinical improvement. Blood gave positive Wassermann on two trials. Fluid was positive five times. Globulin, positive five times. Cells, increased count, varied from two to two hundred on five counts.

Of the five cases with increasing count the one with the greatest increase, Case No. V, shows slight clinical improvement, while the case with the lowest count and least variation progressed to death. The three other cases are slowly deteriorating. All were well marked cases of paresis. All showed positive Wassermann in blood and positive globulin and Wassermann in fluid.

TABLE III

Case No.	No	Diagnosis.	Increase in Count.											Condition.
8014	1	Paresis	28	110	60	30	150	150	80	160	20	50	130	Ambulant.
7117	2	Paresis	2	1	6	0	2	1	2	15	..	..	..	Dead.
8479	3	Paresis	0	0	0	0	0	30	..	..	..	..	..	Ambulant.
8500	4	Tabo-paresis	10	2	10	45	60	..	..	..	..	..	..	Bed-ridden.
8349	5	Paresis	30	2	60	60	200	..	..	..	..	..	..	Ambulant.

In a review of our thirty-four cases a count of three or less was found at some time in all but two, both far advanced paretics.

Seven of the cases showing high average counts were paretics exhibiting excitable, grandiose tendencies during the period they were under observation, but similar results were also found in

cases showing pronounced dementia and comparative remission of active symptoms.

High counts were found in all stages of the disease, from the first to the tenth year of well defined parietic symptoms.

In several cases very great variation was shown in the counts at two week intervals without any appreciable changes in the patients' symptoms.

Low average counts were also found to occur in all stages of the disease. Of ten patients with the highest count below twenty, seven are dead or bedridden, two show remission of active symptoms and one is ambulant but much demented. The period of the disease in these cases varied from the first to the thirteenth year.

While it is hardly permissible to draw conclusions concerning the value of the cell count as an index to the result of treatment, inasmuch as our observations were confined at this time to untreated cases, yet the following facts appear to be reasonably well established:

1. Great variation in the cell count may be found at short intervals in any stage of the disease.
2. Both high and low average counts persist for months at a time in various stages of the disease.
3. A low or falling count is common but not universal before death.
4. A reduction in the cell count to the normal limit frequently occurs in progressive, untreated cases at any time during the course of the disease.
5. The reduced cell count, accompanied with persistence of a positive Wassermann in the fluid, cannot be regarded as having valuable prognostic significance.

PSYCHOSES AMONG NEGROES—A COMPARATIVE STUDY

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There seems to have been evinced, recently, a good deal of interest in the prevalence of nervous and mental affections among negroes, and the belief is rather wide-spread that such disorders have rapidly increased since their emancipation. The steady increase in the negro population of our hospitals for the insane, an increase which is proportionally greater than in the white, tends to support this belief although reliable data upon which it can be based has not been collected.

At the beginning of the year 1870 there were confined in this institution 380 patients, of whom 321 were white and 59 were colored. During the succeeding ten years the proportion of negroes increased more rapidly than did that of the whites, and in 1880 the ratio between the two races was as 1 to 4. The same conditions obtained throughout the twenty years which followed until in 1900 a ratio of 1 to 2.2 was reached and this has remained practically stationary since that time.

The material upon which this study is based consists of the admissions to the Georgia State Sanitarium from January 1, 1909, to January 1, 1914, in all 5,410 cases. Of this number 3,291 were members of the white race, and 2,119 belonged to the negro race. This material offers especial advantages for a comparative study as we find here both races in a uniform general environment, by far the larger part coming from the rural districts and from small communities: The important factor of age incidence of the psychoses can be studied much better here than in sections of the country in which the negro population is made up largely of adults, especially of adult males who have left their accustomed surroundings: One hospital cares for all cases from the entire state, and in it uniform standards are applied to diagnosis and classification.

That certain psychoses appear more often in the one race than in the other is a fact which early becomes impressed upon one who

has to deal with both, and it is a matter of considerable interest to investigate the factors responsible for this condition.

At the outset we must recognize that in every consideration of the negro race we are dealing with two distinct classes, one composed of those of mixed blood, the other of pure or comparatively pure blood. The former class is apt to be better educated, and to occupy a higher social position than the latter, upon whom they look with contempt and aversion, even with feelings of physical repulsion. At the same time they have for the white race a feeling of hatred, because the white does not accept them as equal and subjects them to humiliation and injustice. The black on the other hand accepts his condition of servitude without thought, feels no hatred for the white, but reserves his ill-will for the "bright" of his race, resenting his ridicule and contempt and returning it with feelings of envy and enmity.

It should be understood that this paper deals with the average negro, and that many of the statements it contains do not apply to the highest representatives of the race.

The accompanying table shows, by race and sex, the admissions to this Institution for the past five years:

TABLE I

Year.	White.		Negro.		Total.
	Male.	Female.	Male.	Female.	
1909.....	349	237	194	193	973
1910.....	338	264	207	187	996
1911.....	365	281	212	206	1064
1912.....	375	311	226	196	1108
1913.....	428	343	257	241	1269
Total.....	1855	1436	1096	1023	5410
	3291		2119		

Below will be found the percentage ratio of the various psychoses for each race:

A study of the preceding table will show that certain forms of mental disorder appear with approximately equal frequency in both races, while others are found more often in the white race and still others are met with oftener in the negro race. The psychoses will therefore be considered under the following headings: Group I.—Psychoses occurring with equal frequency in both races. Group II.—Psychoses appearing more frequently in the white

race. Group III.—Psychoses appearing more frequently in the negro race.

TABLE II

Percentage Ratio.	White.	Negro.
Brain tumor.....	.09	.09
Traumatic psychoses.....	.24	.37
Senile psychoses.....	9.1	11.9
General paralysis.....	3.1	7.3
Psychoses with brain or nervous disease.....	4.8	2.9
Alcoholic psychoses.....	4.1	1.4
Drug and other toxic psychoses.....	4.3	.28
Infective-exhaustive and autotoxic psychoses....	2.5	2.3
Allied to infective-exhaustive psychoses.....	.84	1.0
Psychoses accompanying pellagra.....	5.2	6.2
Involution melancholia.....	1.0	.04
Depression undifferentiated.....	1.6	.09
Symptomatic depression.....	.06	0.00
Dementia præcox.....	12.1	14.9
Allied to dementia præcox.....	2.8	4.4
Paranoic condition.....	1.4	.6
Manic-depressive psychoses.....	14.3	20.2
Allied to manic-depressive psychoses.....	3.6	3.5
Epileptic psychoses.....	8.05	8.4
Psychoneuroses.....	1.2	.04
Constitutional inferiority.....	4.4	.9
Imbecility and idiocy.....	9.9	7.03
Not insane.....	.6	.5
Unclassified.....	4.01	4.9

Group I.—Occurring with equal frequency in both races.

In this group are included brain tumor, traumatic psychoses, infective-exhaustive psychoses and allied states, psychoses accompanying pellagra and epileptic psychoses.

Brain Tumor.—This is a rare affection in patients admitted to the sanitarium, only five such cases having been recognized in the 5,410 patients admitted. While three tumors occurred in whites and two in negroes, their percentage ratio is the same for both races. It is probable that if a larger number of the patients who die in the institution came to autopsy tumors would be found whose presence was not recognized before death, but our autopsy records for the past five years do not record such an instance.

Traumatic Psychoses.—The slight difference in the proportion of traumatic psychoses, which is higher in the negro race, may be accounted for by the fact that the usual occupation of the negro is that of a laborer, in which sphere he is more subject to trauma of various kinds than are those engaged in other work, also that his recognized disposition to become involved in difficulties with his fellows is responsible for numerous injuries which the more stable

white escapes. The number of such cases admitted is, however, so small that definite conclusions can hardly be drawn.

Infective-Exhaustive Psychoses and Allied States.—These conditions are found with practically equal frequency in both races. While the clear infective-exhaustive psychoses are met with in a slightly larger number of whites, the allied states are more common in the negroes. One of our reasons for grouping delirious and confused states with the latter is our inability to assign a definite etiological factor for the condition. That this latter group should be somewhat larger for the negro race can be easily understood when the difficulty of obtaining from the patient or his relatives a statement of any value in regard to the exciting cause of his attack is recognized. One of the most frequent factors in the infective-exhaustive psychoses of women is childbirth. It would seem that in the negro, puerperal infection should be often encountered as conditions are in that race so generally favorable for its development. Whether puerperal infection is not more frequent in the negro it has been impossible to determine, but in admissions to this Institution infective-exhaustive psychoses with this etiology were found four times as often in the white, although the admissions of white women were only 40 per cent. greater than those of negro women.

Psychoses Accompanying Pellagra.—It is probable that admissions to a hospital for the insane do not accurately number the cases of mental disorder associated with pellagra. The most prominent manifestations of such disorders are a delirious state, a period of clouded consciousness with hallucinations and apprehensiveness, an active delirium which necessitates constant care. Under such conditions the patient cannot be kept at home unless his relatives are able to provide the necessary care and treatment. The negro as a rule, being unable to supply either, is compelled to have the patient committed to a hospital where he can be cared for without cost. Consequently it is not surprising that the number of such cases is somewhat larger than it is in a race financially better able to care for its afflicted.

Epileptic Psychoses.—In the white race, the stigma which attaches to one having an asylum residence is firmly based, and for this reason an afflicted relative is kept at home, in the hope that some treatment may render commitment unnecessary, until the symptoms of accompanying mental disorder become so marked

that confinement can no longer be avoided. It is possible in this way to account for the small difference in percentage ratio which is slightly higher for the negro race.

Group II.—Appearing more frequently in the white race.

In this second group are found psychoses accompanying nervous or brain disease, alcoholic psychoses, drug psychoses, involution melancholia, undifferentiated depressions, symptomatic depressions, paranoic condition, psychoneuroses, constitutional inferiority, imbecility and idiocy.

Psychoses Accompanying Nervous or Brain Disease.—Among the negroes admitted to this Institution nervous diseases are infrequent, and in almost every such case received arteriosclerosis or syphilis was the etiological factor. That this should be true of syphilis is to be expected as the disease is wide-spread in that race and its adequate treatment the exception. The nervous diseases so commonly found in the white race, chorea, tabes dorsalis, paralysis agitans, etc., are rarely met with in our negro admissions.

Alcoholic and Drug Psychoses.—In view of the frequent statements made by the daily press and the generally accepted opinion regarding the use of liquor and drugs by the negro race, it may be of interest to review the table showing the forms of psychoses found in 2,119 negroes admitted. By this table it will be seen that alcoholic psychoses are found three times as often in the white as in the negro. Very few negroes do not take alcohol when it can be had, but the cost is prohibitive as few members of this race earn more than enough to furnish them with the bare necessities of life, and while they do purchase alcohol occasionally, and in quantity at times, their supply is not steady nor are they able to indulge their appetite over a protracted period. It is upon the basis of chronic alcoholism that the alcoholic psychoses develop, and while there is no doubt but that chronic alcoholism would be frequently met with in the negro were his financial condition better, the fact remains that at the present time alcohol plays a minor part in the psychoses which affect that race.

The fact that Georgia has rather drastic prohibition laws does not account for the absence of steady drinking on the part of the negro, for one who has the means with which to purchase liquor has no difficulty in obtaining it. It is quite noticeable, however, that since these laws became affective (Jan. 1, 1908) there has been

an increase in both alcoholic and drug psychoses among those admitted to this Institution, as will be shown by the following table in which both races are included:

Year.	No. Admitted.	Alcoholic Cases.	Per Cent.	Drug Cases.	Per Cent.
1909	973	27	2.7	15	1.5
1910	996	24	2.4	21	2.1
1911	1064	31	2.9	30	2.8
1912	1108	37	3.3	34	3.0
1913	1269	46	3.6	48	3.7

We are all familiar with the sensational statements made from time to time concerning the enormous increase in the use of cocaine by the negro. The table above cited shows that of the negroes admitted within the past five years only six have suffered from drug psychoses, as opposed to 142 such cases occurring in the whites. Of these six cases, one was addicted to the use of cocaine, one to cocaine, morphine and alcohol, and one to laudanum. In the three remaining patients the assigned cause of the psychosis was in one instance lead, in one quinine, and in one an unidentified drug which was an ingredient of a prescription given by a physician. In 2,119 cases, therefore, cocaine appeared once alone and once in combination with other drugs as an etiological factor in a psychosis, while opium appeared in such a rôle once alone and once in combination with other drugs. As is the case with alcohol the cost of cocaine precludes its habitual use, for cocaine unfits an individual for work, and when work ceases money with which to purchase the drug fails, so that the habit does not become established. It may be that in communities in which the negro is more prosperous, drug psychoses are oftener found, but in admissions to this Institution they are a negligible quantity so far as that race is concerned.

Involution Melancholia and other Depressions.—A striking feature of psychoses affecting the negro race is the infrequency of depressed states. Among the 2,119 cases in the study of which we are concerned were found one case of involution melancholia and two of undifferentiated depression. Even in manic-depressive psychosis the proportion of depressed forms is much below that found in the white race. Unfortunately our records for 1909 do not show the forms of this psychosis, but of 561 cases admitted subsequently presenting a frank manic or a frank depressed form,

exclusive of circular or mixed forms, the white race showed a manic form of the psychosis in 72 per cent. of the cases, a depressed form in 28 per cent., while the negro race presented a manic form in 84 per cent., a depressed form in 16 per cent.

It appears that the negro mind does not dwell upon unpleasant subjects; he is irresponsible, unthinking, easily aroused to happiness, and his unhappiness is transitory, disappearing as a child's when other interests attract his attention. He is happy-go-lucky not philosophical. His peculiar mental attitude is not the result of a knowledge that his poverty, his social position, his unhealthy and cheerless surroundings cannot be bettered, therefore are to be borne cheerfully; but that of a simple nature which gives little thought to the future and desires only the gratification of the present. Responsibility is accepted thoughtlessly and as readily laid aside, its weight is not felt nor does it occasion any anxiety. The simplest amusements distract him, and he gains pleasure from occasions which should rather give rise to sadness. Depression is rarely encountered even under circumstances in which a white person would be overwhelmed by it.

The expression of suicidal ideas is seldom heard, and suicide is an extremely rare occurrence in the negro race, though it is not unknown; indeed within the past year a negro patient in this institution committed suicide.

Paranoic Condition.—While it is the rule to find in the negro race vague ideas of persecution, poison and influence, it is quite rare for a reasonable basis for such beliefs to be expressed or for these ideas to be built up into a logical system. The negro is a creature of impulse, logical reasoning is not one of his qualities nor is his behavior usually determined by a thoughtful consideration of its consequences. If the ability to reason from premises and to form conclusions as a result of such reasoning is characteristic of paranoic conditions, it should not be surprising to find that such conditions are more than twice as common in the white as in the negro race.

Constitutional Inferiority.—It may be surprising at first glance to note the small number of negroes assigned to this group. The negro cannot, however, be judged by the standards set for the white. Moral delinquency and emotional instability cannot be given a prominent place in the consideration of evidence to justify grouping under this heading, for the race as a whole is distin-

guished by these characteristics, and they possibly receive too little consideration when the question of punishment for crime arises. The term "constitutional inferiority" is reserved in the negro race for those who show a more or less marked intellectual defect and in whom episodes of various kinds appear, such as excitements, depressions, hallucinatory states, paranoid trends or those with perverted sexual instincts. Another reason for the small size of this group is, possibly, that even constitutionally inferior persons are able to do fairly satisfactory simple work, which does not require the expenditure of intellectual energy, and many of these negro patients in spite of transitory psychotic episodes are kept at home where they are able to contribute materially to the earnings of the family. Their inferiority is in many instances not recognized by their relatives, nor do their abnormal actions give rise to suspicions of mental disorder; rather are they considered to be unimportant peculiarities of the individual if indeed they receive notice at all. Especially in the lower class of negroes a disposition is seen to look with admiration upon the moral delinquent, the degree of admiration being proportionate to the frequency and seriousness of his infractions of the law.

Imbecility and Idiocy.—In the higher grades of imbecility is preserved ability to perform simple kinds of labor under supervision and in the negro race, where it is the rule for every member of the family to add his quota to the common income, such individuals remain at home as long as their work is fairly productive. In the white race, on the other hand, even the high grade imbecile sooner finds his way to institutions in which he can be cared for and be taught to make use of the talents he possesses. In the negro a moderate mental defect is apt to be less noticeable, as intellectually they are compared with other members of an unintellectual race and their true condition is not appreciated until an episode of some kind renders commitment necessary. For these reasons, probably, the number of negro patients assigned to the above group is smaller than that of the white.

GROUP III.—Appearing more frequently in the negro race.

This group is composed of senile psychosis, general paralysis, dementia præcox and manic-depressive psychosis.

Senile Psychoses.—Among the admissions to this hospital the percentage of senile cases is notably higher in the negro than in the white race. In the following statement may lie an explana-

tion of this fact. While under ordinary circumstances the earnings of the usual negro family are sufficient to keep it beyond actual want, the presence of a helpless, unproductive member, who in addition requires the attention of at least one other who would otherwise bear his share in its support, exerts a heavy burden upon the remaining members, finally pauperizing them. Consequently when there is provided a place where, without cost, this helpless one can be cared for, even better than by his relatives, its aid is earlier and more readily invoked than is the case in the white race. On the other hand, in the latter race is found a lack of confidence in state hospitals, a desire to avoid the public acceptance of a family taint, a better financial condition and a willingness to make sacrifices if necessary in order that the few remaining years left the patient may be spent with his own relatives, so that commitment is not resorted to, in many cases, unless violent or dangerous features of the psychosis are manifested.

General Paralysis.—For many years it was claimed that general paralysis was seldom met with in the negro race. That this claim is untrue is generally accepted today. Its genesis probably lay in the frequent failure to recognize the disease when unaccompanied by the expansive ideas which were formerly looked upon as characteristic of it. In the negro paretic a simple dementia is from the beginning much more commonly encountered than an expansive or a depressed state. This dementia was formerly attributed to erroneous causes, consequently the cases were assigned to groups other than that of general paralysis. With the introduction of the Wassermann test and spinal puncture the true character of these cases is more generally recognized. During the past three years lumbar puncture was resorted to in every case in which paresis was suspected; previous to that time puncture was made only in the cases where doubt existed as to the correctness of the diagnosis.

That paresis should be encountered more often in the negro race than in the white can be readily understood, for in the former race syphilis is prevalent. This prevalence is due partly to the immorality of the negro which tends to spread the disease, partly to the fact that through ignorance or carelessness he takes no precaution against its being communicated to others. It seems to be impossible to impress upon the syphilitic negro the gravity of the disease from which he suffers and it is extremely rare for

one of these patients to follow implicitly the advice of his physician or to persist in treatment after the chancre has healed and the eruption has disappeared.

The accompanying tabulation shows the percentage of paresis in the two races and sexes based upon their respective admissions for the past five years:

	Per Cent.
White males.....	4.5
White females.....	1.2
Negro males.....	10.2
Negro females.....	4.2

Dementia Præcox.—The explanation of the fact that the ratio of dementia præcox is higher in the negro than in the white is rendered more difficult by reason of the absence of certain factors which we are accustomed to find in the study of such cases occurring in the latter race. The reticence which the white has to contend with in seeking to gain an insight into the negro's personality, a reticence which is the result of a knowledge that the white is not in sympathy with his peculiar beliefs, and a fear of ridicule, renders it extremely difficult to gain accurate information from him. If we can judge, however, from the unsatisfactory anamneses received from the relatives of the negro patients admitted, it would appear that in dementia præcox the shut-in personality is rarely found. On the contrary the negro is a society-loving individual, and seeks companionship wherever it may be found. He is constantly seeking pleasure and finds enjoyment in conditions which do not appeal to the white. His religious convictions are most superficial, and while a great church goer, easily swayed by religious oratory and capable of excessive religious excitement, he has no realization of the basic principles of religion and gives way to all kinds of moral derelictions while professing the deepest piety. Of true morality he has no conception nor does the discrepancy between his profession and practice occasion any conflict in his mind. Conscience and responsibility trouble him not at all, while the feeling of gratitude for favors extended finds no place in his makeup. Self-study is a pastime which does not appeal to him, and while strong in his sexual inclinations, which are gratified whenever occasion presents, he indulges them thoughtlessly and is rather proud of his excesses than apprehensive in regard to their results.

If dementia præcox is considered from the standpoint of a psychogenetic disorder, in the absence of the shut-in personality, of habits of introspection, of sexual difficulties and sexual ruminations, other factors must be sought for, which in the negro exert influences favorable to the development of the affection.

Toward members of his own class the black is suspicious, fearing not ridicule or contempt, but bodily harm; attributing to them all misfortunes and illnesses, which are supposed to be brought about by the aid of witchcraft. The black, although among the more intelligent this is true in smaller measure, is brought up in an atmosphere of fear. He is superstitious, believes in ghosts, witches, spells, poisons and conjuring. He has at his fingers' ends the meaning of signs, and is versed in the measures by which ill luck may be warded off. From the cradle the negro lives in the fear of the supernatural. As an infant he is threatened with beasts, spooks and witches. In childhood the chief subjects of conversation which he overhears are witchcraft, spells, ghosts and conjuring. The meaning of signs is instilled into him, and he watches his every act that he may escape bad luck. The ruminations of the negro child deal only with such matters. As he reaches puberty new ideas come into consideration, and the questions of love and of sexual gratification enter. These topics are not handled in a normal manner, but the influence of charms and of herbs is resorted to in the effort to bring his desires to fruition. In unfamiliar trivial sensations he recognizes that he is bewitched by one who desires his love or conjured by one whom he has discarded. Every sickness is attributed to the agency of poison; every misfortune to that of witchcraft. The life of the negro is made up of invoking the aid of such agencies and of guarding against such efforts on the part of others.

The fear of the supernatural, the suspicions of his fellows and the necessity of guarding at all times against bad luck and the machinations of enemies, each of these factors may play a part in bringing about a psychosis which more frequently than in the white takes the form of dementia præcox.

On account of the anomalous position occupied by the mulatto there does exist a certain mental conflict, and in this class the shut-in personality is occasionally found.¹ Being excluded from

¹ In the available anamneses the only mention of shut-in, seclusive habits occurred in the case of mulattoes.

social intercourse with the whites, the desire for which they too vehemently deny, and holding themselves above association with the black, they form a world of their own, but as a whole they are dissatisfied and resentful, being conscious of the injustice meted out to them by the former and of the ill-feeling manifested toward them by the latter. In a certain proportion of this class ethical feelings are developed, moral irregularities are not condoned and an exaggerated self-respect appears. Even here sexual conflicts do not occur, and though sexual instincts are recognized they are accepted as normal, and are accompanied by no suggestions of shame or mystery.

Manic-depressive Psychosis.—The discrepancy between the ratio of this psychosis in the two races is still more striking than in dementia præcox, but here it occasions no surprise. The negro race, as has been said, is emotional; in grief, noisy and obtrusive, it is of a superficial character and soon passes; in happiness, active, boisterous, restless, manifesting increased muscular activity, it is aroused with little provocation and reaction to it is excessive. Pleasure loving, excitement seeking, quick to notice and voluble in expression, it would seem that in this race we have a foundation for an affective psychosis which could hardly be stronger. Even under depressing environment, poorly housed, poorly fed, relegated to the most unattractive quarters, imposed upon, humiliated and contemptuously treated, still depression is foreign to their natures and happiness breaks through. Slight pleasures cause exaggerated evidences of elation. With no thought for the morrow, no reflection over the past, they live only in the present and extract from every trifle all of the enjoyment it offers. We have seen that the manic forms of the psychosis occur in a much large proportion to the depressive forms than is the case with the white race, and this is only what we should expect to find in a race whose characteristics are such as have been enumerated above.

Psychoses Unclassified.—The proportion of such conditions is higher in the negro race, and is to be accounted for by the impossibility of securing anamneses which would aid us in reaching a satisfactory estimate of the cases. The anamneses which we do obtain are rarely reliable and not infrequently are they misleading.

ON THE CEREBELLAR SYNDROME OF BABINSKI WITH REPORT OF A CASE

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In the late nineties a new triad of cerebellar signs—namely, dysmetria, asynergia and cerebellar catalepsy, was presented before the Neurological Society of Paris. Adding to these, the adiadochokinesis, described by Babinski several years before, a new cerebellar syndrome was proposed,—the Babinski syndrome in distinction to the classical cerebellar syndrome of Duchenne, with its titubation, tremor, nystagmus and other well-known signs. This communication has excited keen interest in France, where despite the rarity of the syndrome, especially in pure form, a number of cases has been reported. Elsewhere, however, the subject has received scant attention.

I propose in the following pages an exposition of the principal data, together with the report of a case which came under my observation in the summer of 1913. Theoretical considerations have thus far produced no unanimity and will be omitted. For these the reader is referred to the original literature.

A

Disturbance of the diadochokinesis (dys- or adiadochokinesis) that it is a disturbance in the ability to carry out voluntarily in rapid succession, a series of antagonistic movements is now too generally recognized to need detailed account. The phenomenon, a homolateral one, appears particularly in the upper extremities, maybe unilateral or bilateral, and is best demonstrated by the rapid alternation of pronation and supination. The sign must be judged with caution. The mere inability to carry out rapidly alternating movements does not in itself imply its existence. Unfortunately, sufficient criticism has not always been used. To determine whether the sign is present, the following must be observed. The patient must be in complete or almost complete possession of his muscular power,—that is, he must be able to carry out elementary movements with normal rapidity. It is obvious if this is impos-

sible a rapid succession of alternating movements will also be impossible. In judging an unilateral adiadochokinesis it must not be forgotten that the left arm is frequently less skillful and quick than the right: finally that there are individuals who are constitutionally, so to speak, incapable of performing antagonistic movements in rapid sequence. Oppenheim has often observed this so-called physiological adiadochokinesis in children.

With these reservations, what is the significance of the sign? According to Babinski, it points conclusively to cerebellar involvement. He claims he has never noticed it in other affections. Even in tabes, according to him, with notable disturbance of sensibility and ataxia, adiadochokinesis appears to be constantly absent.

The phenomenon has been studied by a number of authors, a few of whom may be cited. Campbell and Crouzon in a clinical study of seven patients with disseminated sclerosis and one patient with cerebellar lesion found that of these, four could not even perform rapid isolated movements of pronation and supination, three were able to carry out isolated movements in perfect fashion but failed to accomplish them in quick succession,—were therefore adiadochokinetic—while the eighth patient showed unilateral intention tremor, lateropulsion and adiadochokinesis all affecting the same side. Oppenheim in his treatise on "Brain Tumor" (Obs. XII) notes a right-sided adiadochokinesis, the lesion found involving the right cerebellar hemisphere: Gierlich a right-sided adiadochokinesis with as autopsy findings, a sarcoma of the inferior vermis, compressing both cerebellar hemispheres, especially the right: Flatau, a neoplasm compressing the left cerebellar hemisphere with homolateral adiadochokinesis.

The evidence would therefore seem fairly convincing both clinically and pathologically that we have in adiadochokinesis a cerebellar sign, whether pointing to an involvement of the cerebellum alone or including its afferent and efferent systems as well. Oppenheim in the last edition of his text-book though appreciating the value of the phenomenon still urges caution, however, before accepting it as strictly pathognomonic of cerebellar affections.

B

Heppert in 1877 was the first according to Luciani to point out disturbances of metria in cerebellar disease. His patient at the

age of three passed through an attack of so-called "nervous fever" manifesting itself in convulsions and choreiform agitation. Recovering from this acute attack, the child was left feeble-minded; his gait and station were oscillating and uncertain; his speech slow and scanning; while what concerns us particularly, in all four extremities was noted a heaviness, an awkwardness, a disturbance of metria. The significance of this latter disturbance does not appear conclusive—clinically, because of the high degree of mental impairment (the patient never learned to read or write)—pathologically because of the diffuse involvement not only of the cerebellum but of the cerebrum and cord as well.

It was left to Luciani to give a firmer basis to the problem. He found that on ablation of half the cerebellum in dogs, the animals raised their legs on the operated side in an exaggerated manner while on the unoperated side, leg action was normal. His observations were later confirmed and amplified not only for the dog but for the monkey, by A. Thomas and Lewandowsky. The latter aptly compares the walk of the operated dogs to the walk of the cock or cat, that is to say, the animals either raise their paws in an exaggerated strutting fashion or else trail them. In operated monkeys similar disturbances are produced. Furthermore abnormalities in prehension. There appears miscalculation of space. In grasping, the extremity reaches out too far, the hand is opened too wide, closed too tightly. There exists dysmetria.

Dysmetria as clinically understood corresponds to the experimental data. A movement may be said to be dysmetric when it is executed without measure in time or space, when for example it is carried out too brusquely, when it passes beyond its goal, when in other words, the initial impulse is too powerful, the rapidity of movement too great, the arrest of movement too late (Thomas). The disturbance, in a word, appears to lie in the difficulty or impossibility of regulating the intensity of an impulse or exercising over it an inhibitory action (Babinski). Dysmetria in a broad sense may therefore be either primary or secondary—primary if it exists independent of all motor and sensory disorders, secondary, if subordinate to their existence. It is the primary dysmetria, naturally, which is regarded as a cerebellar sign and which is held by Babinski and Thomas to belong almost exclusively if not exclusively to diseases of the cerebellum.

The disturbance may be demonstrated by a number of simple maneuvers. In the finger-nose test, for example, the finger after following the desired course almost to the nose does not stop there but instead is flung violently against the cheek beyond (Babinski). On attempting to draw a line between two given points, the patient is unable to stop at the second point but passes it. In fact dysmetria may be observed in the majority of the patient's ordinary acts. On seizing an object or on letting it go, it may be seen that he opens the hand abnormally wide. In walking, you detect in the first phase that he overflexes his thighs on his pelvis, his feet are therefore raised too high; in the second phase that he flings his feet sharply to the ground, that there is dysmetria of the hip extensors. In the heel-knee test the heel is flung beyond its goal; on attempting to touch with the foot, objects at various levels, again the goal is passed.

The question must arise,—but how does all this differ from ordinary peripheral ataxia? Surely it is common observation that tabetics may show the same phenomena, the same disturbances of movement, gait and prehension. Granted,—dysmetrics, however, are to be distinguished from peripheral ataxics by two fundamental characteristics—by the complete or almost complete conservation of their sense of orientation toward a given goal—and by the practically negligible effect of sight on the regulation of their movements (Thomas). In contrast to peripheral ataxia, dysmetria is a primary disorder. It is not dependent upon disturbances of sensibility, motility, muscle tone, etc. The patient knows that his movements are dysmetric. He has an exact conception of the position of his limbs whether his eyes be opened or closed and under both circumstances, his movements are accomplished in the same manner.

In France, the above conception appears to be generally accepted. One need simply mention such observers as Marie-Foix, Dejerine-Jumentie, Laignel-Lavastine. Oppenheim, however, is apparently unwilling to concede to dysmetria a special existence, briefly dismissing it with the remark that it is included under the term ataxia: Lewandowsky assumes a similar attitude. The disagreement would seem, however, to be largely a question of terms. That there is a cerebellar component even in peripheral ataxia is scarcely to be doubted nor that in tabes, cerebellar function is regularly compromised to a greater or less extent through inter-

ference with afferent impulses via the posterior roots as well as through the practically constant implication of the columns of Clarke. But, granting this, if dysmetria signify nothing more than a refinement and specialization of the term ataxia, to quote Oppenheim in his estimation of asynergia, it deserves careful consideration. The phenomenon, according to Thomas, is best demonstrated by acutely destructive cerebellar lesions,—softening, hemorrhage. Tumors and cysts produce as a rule too many neighborhood signs and on account of their slower evolution are more deforming than destructive so that implicated tissue has a greater chance to readjust itself.

C

Of quite special interest is the so-called cerebellar asynergia proposed by Babinski. The sign reveals itself in that the individual affected is unable to simultaneously combine a group of muscular displacements which under ordinary circumstances should go to make up a normally executed movement or act. Harmonious synergic action is replaced by a sequence of simpler movements: it is decomposed, so to speak, into its elementary components. According to the gravity of the disturbance a major and minor asynergia may be distinguished, the first referring essentially to a disturbance of locomotion, the second to a number of clinical tests to be described.

Duchenne, in his analysis of locomotion, showed that the act of walking is composed not only of synergic movements of different segments of the lower extremities but also of an associated forward inclination of the trunk. This forward inclination may be impaired or abolished whether due to various mechanical restrictions (spinal ankylosis for example), paralysis of the muscle groups necessary for its execution or finally because of a disturbance or loss in the faculty of associating the translation of the body with the propulsion of the legs. It is this last disturbance which gives rise to major cerebellar asynergia, which in extreme cases may prevent the affected individual despite—and this is important—intact motor power, from advancing more than a single step. His trunk extended on his pelvis or bent a little backward does not follow the movement of his legs. His legs function, his body remains inert. The individual has become decomposed, so to speak, into a functioning and non-function-segment. The phenomenon is quite distinct from tabetic ataxia no matter what the

degree of incoördination (Babinski). This may be demonstrated further by a simple maneuver. If, for example, you stand in front of the patient and keep drawing him lightly forward by the hands at each movement he flexes his thighs, a greater or less degree of locomotion may now be possible. You will notice, in contrast to tabetic ataxia, that his feet show little or no noticeable deviation from the course they would normally take and that his steps succeed one another with a certain regularity.

To demonstrate the minor asynergias, the following tests are employed:

1. The patient attempts to bend backward. While the healthy individual will show certain compensation movements, namely flexion of the thighs on the legs and a rise on the toes in order to maintain his equilibrium, these synergias do not now occur. In consequence the patient loses his balance and falls. The test reveals what one might call the complement of the major asynergia. In one case it is the trunk which fails to respond, in the other the lower extremities.

2. With the patient lying flat on his back, let him either draw his heel to his buttock or perform the heel-knee test. Our normal individual will simultaneously flex his hip and draw up his leg, not so the asynergic. First, he flexes his hip, raising the extended leg abnormally high; with a second movement he flexes his leg—finally with a third movement, he draws it up. Now if told to extend his leg, he goes through the same movements but of course in an inverse order. Here then again is a decomposition of movements. Instead of being associated, they follow each other.

3. Finally the combined flexion of the thighs and pelvis may be mentioned, a sign first described by Babinski in connection with organic hemiplegia.

D

The fourth and probably most striking sign has been termed cerebellar catalepsy. Imagine a patient troubled, it may be, with asynergia so extreme that he is unable to walk. Now let him lie on his back, his thighs flexed on his pelvis, his legs apart and slightly flexed on his thighs. At first his trunk and extremities will describe large oscillations in different directions, particularly laterally. These movements last a few seconds. Then the body and lower extremities become motionless. They assume a fixity,

to quote Babinski, so remarkable in its perfection as to be almost waxen, untroubled by any muscle jerkings such as are usually seen even in most vigorous subjects in the same position. This immobility may last several minutes and it is a curious fact that almost no sensation of fatigue is induced. It was my interesting experience to see such a patient in Babinski's clinic. Contrast with him a tabetic under the same conditions, even one in whom the disease has made little headway. It is impossible for him to preserve his equilibrium even seconds.

II

CLINICAL DATA

In the summer of 1913 the patient to be reported entered the Neurological Institute. Except for diabetes in two maternal relatives, his heredity is negative. He is the eldest of five healthy children. During the eighth month of pregnancy his mother became eclamptic and he was instrumentally delivered. Though weighing but 5½ lbs. at birth, he developed normally.

At the age of six, he had a mild attack of diphtheria lasting ten days. Antitoxin was administered. Six months later, measles; and three years ago, so-called German measles. Up to his present illness, he was regarded as unusually bright and active. His present trouble dates from an attack of scarlet fever, March, 1913, appearing typically with headache, sore-throat, vomiting and characteristic rash. On the third day of his illness diphtheria antitoxin was administered, the following day, horse serum. A few hours after the latter injection marked edema of the face and a general urticarial eruption occurred—at the same time, mental confusion passing into violently agitated delirium which persisted for the next five weeks.

The sixth week of his illness, choreiform movements were noted, at first facial, next involving the arms and finally the legs. These movements were never more than moderate in intensity.

During the seventh week he began to talk a little. His speech was profoundly affected. To quote his mother "he would open his mouth very wide, would talk very loud, would work very hard to get the words out and yet could scarcely be understood." At the end of the eighth week he was allowed out of bed and a few days later was brought to the Neurological Institute.

His physical examination though containing a number of negative details follows practically in full:

The pupils are a little eccentrically placed (inwards), moderately dilated, equal, regular and of normal reaction. There is no ptosis or strabismus. Range of ocular movements is free. Nystagmus is absent. On forced deviation, however, consider-

able bulbar unrest of choreiform character occurs. There is no restriction of the visual fields and the fundi are normal.

The fifth nerve, motor and sensory, is intact.

The face has rather a dull adenoid look. The naso-labial folds are flat. Occasionally there is a slight involuntary twitch of the frontales and rarely slight choreiform movements about the lips, otherwise the expression remains fixed. Voluntary muscular innervation is good, well-sustained: associative movements and involuntary mimic play without defect. The sphincter of the lids and mouth are strong.

Hearing is acute. Whisper is eight feet +. Air conduction is greater than bone which is slightly diminished. The labyrinths are very active both static and auditory. The caloric and galvanic reactions are normal. (Dr. Dench.)

The palate hangs and moves well. The palatal and pharyngeal reflexes are active and equal. The tongue is protruded straight but shows moderate choreiform movements and a tendency to be drawn in and out of the mouth.

Speech is slow and labored. The syllables are scanned, separated by marked pauses and strongly accented, the greatest emphasis usually falling on the ultimate which comes out as a rule explosively. Articulation is indistinct, blurred, frequently unintelligible. His lips show exaggerated effort but no choreiform accompaniment.

The head and neck are affected almost constantly by irregular choreiform jerks of moderate amplitude. Range of voluntary motion is normal, muscle strength good except that forward flexion is rather easily overcome.

The nutrition of the arms is fair, without local wasting. Certain hypotonias are evident. If the patient extends his arms above his head, instead of holding them at the normal angle midway between pronation and supination with palms directed inward, they are held either in frank pronation or with palms facing outward. The *signe de la main* of Babinski fails to elicit anything noteworthy. All static attitudes are poorly sustained. The arms weary quickly and describe wide irregular vertical oscillations, especially the right arm. At rest there occur moderate-ranged choreiform movements of the shoulders and arms, especially of the distal segments. These movements are increased under dynamic conditions. The attitude of the extended hands shows nothing striking. Range of motion at all the joints is normal: power quite proportionate to the patient's development. Evidences of dysmetria cannot be determined. In prehension there are no abnormal innervations and objects are well grasped. He draws a line between two points without overreaching. In the finger-nose test, the tip of the nose is usually accurately estimated. After the tip has been attained, however, the finger shows more or less lateral oscillation though rarely great enough to displace

it. True intention tremor is absent. Nor is there evidence of asynergia. Disturbances of *adiadochokinesis* are however definite. The left arm is held flexed at the elbow, the right extended. The pronation-supination succession is slowly and clumsily performed with at times complete arrest of movement, especially when both arms are acting together. His finer purposive hand movements are rather slow and awkward: his writing large and unsteady, due, apparently, chiefly to the choreiform accompaniment. The arm jerks are normal.

On attempting to sit up from dorsal decubitus the sign of combined flexion of the pelvis and thighs appears. The patient makes no attempt to dig down his heels. His legs fly upward and he rocks on his buttocks as a fulcrum. The abdominal muscles contract well however, without umbilical excursion. The reflexes, epigastric and abdominal, are active and equal.

The legs are fairly developed and nourished. There is perhaps some slight hypotonia at the thighs and knees. Lying on his back range of motion is normal and the simple movements—flexion, extension, adduction, etc., are neatly carried out. The power of the muscle groups corresponds adequately to their development. Disturbance first becomes apparent in the heel-knee test, the so-called *dysmetria*. The heel instead of being carried accurately to the knee is flung violently above it, often as high as the groin and thence by a series of small movements slid gradually onto the patella. The patella once attained, small oscillations may occur but these are inconstant. The right leg appears to be more affected than the left. Closure of the eyes is without influence. But strict attention with slowing of movement undoubtedly tends to produce greater accuracy. On extending the legs again a tendency to fling and to come down sharply on the heels is apparent. There is no intention tremor, no cerebellar catalepsy. On the contrary, the raised legs tend to sway almost immediately and quickly fall. No choreiform movements are seen except for an occasional slight movement of the left great toe. The knee and ankle jerks are active, equal not exaggerated. The plantars are frankly flexor.

It is when the patient is got up on his legs that more striking disturbances are evident. In the first place it is noted that he rises laboriously. He raises himself two or three inches from the chair, cannot maintain his center of gravity and sinks heavily downward again. It is apparent that the extensors of the spine fail to come on time to the assistance of the extensors of the thighs and legs. There occurs in other words a *dys-synergia*. This process is repeated a number of times till with unusual luck he may manage to fling himself upward into a toppling standing position.

He stands habitually on a broad base. There is no titubation though his stability is somewhat disturbed by small irregular

choreiform movements of the trunk. He can draw his legs together but approximation is not affected as normally by a single adduction but by a series of small rotatory movements. In the effort he has considerable trouble keeping his balance but feet once together he stands without swaying and there is no trace of Rombergism.

In his effort at locomotion, we detect the major asynergia. One leg advances, then the other, but his body is not translated: it tends to lag behind. This disturbance is at times so marked that he is quite powerless after a step or two to advance a single inch but stands as if nailed to the floor. Under such conditions, he loses his balance and falls backward. This dissociation of compensatory movements can be produced at will by exerting slight backward traction on his gown. Otherwise his gait is characterized by a broad base, a marked tendency to fling out his legs laterally from the hips and a stamping down on his heels.

The vertebral column is straight, without deformity or tenderness. Range of motion of the back is normal, power good. When asked to bend backward while standing, however, dys-synergia again takes place. The normal flowing curve of the spine is not produced. Instead there occurs an awkward angular bend in the dorso-lumbar region. His legs, instead of showing a compensatory flexion at the knees remain extended and there is no compensatory rise on the toes. As a result, equilibrium cannot be maintained and he falls heavily backward en masse.

Not the slightest disturbance of sensation can be determined, either superficial or deep. The appreciation of posture, passive movement, stereognosis, compasses and differences in weight is quite intact.

We have then a lad who has just passed through an attack of scarlet fever with marked delirium. His muscle power is good. There is no sign of paresis. Sensibility is intact: Auditory and vestibular reactions, normal. He shows, however, profound disturbances of coördination, dysmetria, asynergia, adiadochokinesis, —and generalized choreiform movements.

How are we to regard this case? That there has been involvement of both the cerebrum and cerebellum can scarcely be doubted. Cerebral involvement, suggested by the delirium, is made convincing by the undoubted mental deterioration which remains behind. Before his illness bright, standing well in school, he is now in the ungraded class. He is forgetful, unable to concentrate, mischievous, childish. (March, 1913.) The cerebellar signs above noted have disappeared. But a general awkwardness in movement and a tendency toward explosive, scanning speech are still apparent.

The diagnosis of encephalitis appears best founded. But an interesting question is raised by the administration of antitoxin and horse serum. Following their injection an anaphylactic reaction occurred—edema, urticarial eruption; and at the same time, mental confusion passing into delirium. It is not unreasonable to suppose that these latter disturbances represent an anaphylactic reaction on the part of the nervous system. Such reactions are by no means unknown. One need merely be reminded of the admirable paper by Hutinel and Darré on the subject. Granting this, are the above nervous sequelæ of anaphylactic origin, are they of infectious origin, or finally are they infectious on an anaphylactic basis? Would they have occurred if antitoxin, horse serum had not been administered? Unfortunately, we can do nothing more than propose these questions.

Following the successful propagation of the poliomyelitis virus in the hitherto unsusceptible rabbit, the author attempted to induce the disease in guinea-pigs after primary sensitization with horse serum. The results were quite negative. The problems though not strictly analogous have the same general trend.

The choreiform movements in this case are of particular interest associated as they are with the Babinski syndrome. It has been suggested recently by the French school that Sydenham's chorea is due to cerebellar affection, in all probability cortical—a low-grade cerebellar encephalitis. In support of this theory dysmetria, adiadochokinesis and other cerebellar signs have been recorded. The present case is particularly suggestive in this respect, for instead of the chorea being the significant feature here and the so-called cerebellar signs subordinate and to be searched for, the situation is reversed. That generalized choreiform movements can be produced by cerebellar lesion has been shown by Touche, who found at autopsy an area of softening destroying the whole of the vermis superior together with adjacent parts of the cerebellar cortex.

Following are brief abstracts from the literature of the more important cases showing the Babinski syndrome together with the pathological evidence which supports their cerebellar origin.

1. Babinski. On Cerebellar Asynergia (original communication), *Rev. Neurol.*, 1899, p. 806.

(a) Scanning speech, intention tremor, combined flexion of the thigh and trunk. Major and minor asynergias.

(b) Patient 29, symptoms of three years duration—violent headache, sudden blindness of left eye, followed by blindness of right eye. Attacks of unconsciousness. Intermittent delirium. Vomiting. *On examination*: Double optic neuritis. Sensation intact. Motor power and reflexes normal. Intense major asynergia preventing independent locomotion. Sudden exitus. *Post mortem*: Increased intracranial pressure, dilated ventricles. On right side of cerebellum an ovoid tumor size of a hen's egg compressing the cerebellum and encroaching somewhat on the upper part of the bulb. Tumor bounded inferiorly by the middle cerebellar peduncle. Local compression of the cerebellar cortex.

2. Babinski. Jumentie. Unilateral Cerebellar Syndrome, *Rev. Neurol.*, 1911, p. 115.

Male 43. Lues. *Æt.* 20. In 1910 acute right-sided hemiplegia accompanied by violent pain of short duration in right occiput region. *Examination*: 10 months later showed nystagmus and involving the right side slowing of movements, tremor dysmetria and minor asynergia. No signs of hemiplegia. Left side intact. Serum Wassermann positive.

3. Babinski. Hemi-asynergia and Hemi-tremor of Cerebello pontine Origin, *Rev. Neurol.*, 1901, p. 200.

Male 54. Symptoms of 2 years duration of gradual onset and progressive course. Involvement of fifth, sixth, seventh and eighth cranial nerves. Tremor of right arm predominantly intentional. Marked asynergia of right leg which is held abducted and stiff in walking. No signs increased intracranial pressure. Reflexes and sensation normal. *Diagnosis*: A lesion probably vascular involving the right inferior cerebellar peduncle in the pons.

4. Marie-Foix. Cerebellar Hemisindrome of Syphilitic Origin, *Rev. Neurol.*, 1912, p. 62.

(a) Male 80. Wassermann in serum and fluid positive. Lymphocytosis. Symptoms of six years duration. Right A-R pupil; left tardy. Knee and ankle jerks greatly diminished. Diminished muscle power of right side. Lateropulsion to right. Dysmetria right leg. Asynergia of right arm and leg. Cataleptic tendency. Exitus three months later following right-sided hemiplegia. *Post mortem*: (1) A recent white softening of the cerebellum and L. hemipeduncle, the terminal lesion. (2) An old lacuna of the right superior cerebellar peduncle situated a little caudal to the red nucleus, involving also the pyramidal tract and Turck's bundle.

(b) Male 70. Lues. *Æt.* 63. Symptoms of 4 years duration following a vertiginous ictus. Wassermann positive. Lymphocytosis. A-R pupils. Titubating gait. Asynergia and dysmetria limited to the left side. Homolateral adiadochokinesis and cata-tonia present but not marked. Exitus from broncho-pneumonia. *Post mortem*: A lesion of small diameter burrowing through the entire left middle cerebellar peduncle, except its most superior

portion. Marked diffuse syphilitic involvement of meninges and vessels.

5. Enriquez. Bulbo-pontine Lesion with Cerebellar Syndrome, *Rev. Neurol.*, 1912, p. 758.

Case complicated and not conclusive. Symptoms apparently chiefly of vestibular origin.

6. Scherb. Disseminated Sclerosis Freuste or Cerebellar Syndrome of Babinski, *Nouv. Icon.*, 1905, XVIII, p. 31.

Male. *Æt.* 40. Marked locomotor disturbances following pneumonia.

7. Dejerine-Baudouin. A case of Cerebellar Syndrome, *Rev. Neurol.*, 1911, p. 148.

Male 32. Severe phlegmon of iliac fossa. Following this sudden ictus with loss of consciousness. Examination 5 months later showed: Scanning speech—major and minor asynergia, adiadochokinesis, dysmetria, cerebellar catalepsy, all of bilateral distribution. No vertigo. Functional vestibular tests normal. Nervous system otherwise intact. Presented as a pure cerebellar syndrome with its probable lesion an area of softening (vascular) at the level of the vermis.

8. Dejerine-Jumentie. Disseminated Sclerosis—Cerebellar Type, *Rev. Neurol.*, 1912, p. 300.

Male 26. Symptoms of 18 months duration. Scanning, explosive speech followed by weakness of legs and tremor of upper extremities. Partial recession of speech disturbance and tremor with coincident appearance of major and minor asynergia. Dysmetria, adiadochokinesis and catalepsy. Nystagmus variable. Muscle force unimpaired. Deep reflexes greatly exaggerated. Abdominals absent. Sensibility intact. Vestibular tests normal.

9. Laignel-Lavastine. Right Hemiasynergia, etc., etc., *Nouv. Icon.*, 1906, XIX, p. 539.

Following an ictus, for two years cerebellar asynergia and diminished muscle power of right side. Violent almost constant vertigo, making station impossible. Reflexes left greater than right. Plantars flexor. Sight and pupils normal. Doubtful sensory defect. Hearing apparently diminished right and left. Demented. Death following a second ictus. *Post mortem*: Marked atheroma of cortical vessels. Two hemorrhagic foci: (a) A recent focus destroying the right half of the ventral part of the pons. (b) An old focus involving the postero-external portion of the white substance of the right cerebellar hemisphere with partial degeneration of the homolateral olivo-cerebellar tract, superior and inferior cerebellar peduncles and of the olivo-bulbar fibers of the opposite side.

ADDITIONAL REFERENCES

Babinski, *Revue Mensuelle de Médecine Interne*, 1909, No. 2, p.

113.

Thomas, *La Clinique*, 1911, No. 18.

Society Proceedings

FORTIETH ANNUAL MEETING OF THE AMERICAN NEUROLOGICAL ASSOCIATION

HELD AT ALBANY, N. Y., MAY 7, 8, AND 9, 1914

The President, DR. HENRY HUN, in the Chair

(Continued from page 671.)

THE CENTRAL CANAL OF THE SPINAL CORD

By Dr. S. P. Kramer, M.D.

This paper gave the result of investigation of 207 adult spinal cords in regard to existence of a patent central canal and the termination of the central canal at the lower end. The importance of the canal in explanation of pathogenesis of ascending disease of the cord was considered as well as the circulation of the cerebrospinal fluid.

In only a very small percentage of adults, about 7 per cent. is the central canal patent throughout its entire length. In that portion of the cord, however, which is affected by the injection of cocaine for the purpose of producing what is called lumbar anesthesia, the central canal is patent in a very large percentage, but is blocked in most of them in the cervical region. This is the reason so few deaths from this form of anesthesia occur, as the drug cannot reach the fourth ventricle. If we had been in the habit of using this procedure in young children we should have had a much larger mortality.

THE TREATMENT OF JUVENILE PARALYSIS WITH SALVAR- SANIZED SERUM BY THE INTRASPINOUS METHOD: REPORT OF A CASE

By C. Eugene Riggs, M.D.

C. Age eight and one half years, both parents luetic. Nothing abnormal was observed until the fourth year, when it was noticed that he did not remember as formerly and that his expression had become vacuous. He was sent to school in his seventh year, but he could not learn the simplest things.

Argyll-Robertson pupils, increased knee jerks. Ankle clonus and Babinski in both feet. Marked Rombergism. Serobiological findings: Positive Wassermann in the blood serum and spinal fluid in all dilutions down to .07 c.c., Lymphocytosis 72 c.mm. Noguchi positive. The Lange colloidal gold test gave the characteristic curve of paresis. He has been given several injections of salvarsanized serum, with slight betterment.

PARALYSIS AGITANS SYNDROME WITH SYPHILIS OF THE NERVOUS SYSTEM

By Carl D. Camp, M.D.

Review of the cases reported as *tabes dorsalis* with *paralysis agitans*. Report of a case showing the symptoms of both of these conditions. Serological study. Salvarsan treatment. The relation of tremor due to organic brain disease, to *paralysis agitans*.

Dr. Dercum thought that it is not as yet time to express definite conclusions regarding the usefulness of salvarsan in the so-called para-syphilitic disease. He had made an extensive trial of this remedy in both *tabes* and *paresis*. Like Dr. Sachs he had noted some improvement, such as the lessening of pain in *tabes*, but other than this he could not say that he had met with changes other than those which are induced in the patient's mental attitude by the suggestion of any novel plan of treatment. He is sorry that Dr. Sachs, in testing the use of the remedy made a coincident use of mercury. However, he had no doubt that while it obscured the validity of the conclusions, it was beneficial to the patient. He had himself used the intraspinal method in *paresis* in a number of cases. He had noted in several of them a very decided remission of symptoms but he could not claim that these remissions had been more pronounced or longer in duration than those which he had seen follow the older methods.

He was much interested in what Dr. Sachs said in regard to the intraspinal injections of salvarsanized serum. He believed that this method, notwithstanding the criticism to which it is justly liable, should be tried out.

Regarding the whole question of salvarsan, he believed it is important that we should not pursue too intensive a treatment and neither give the remedy in too large doses or at too short intervals.

Dr. Knapp said he had expressed some skepticism as to the benefit derived from salvarsan in the treatment of syphilis of the nervous system. He had not seen very startling results from giving salvarsan, any better than in the older methods of treatment. He was well aware in *tabes*, particularly we sometimes get very striking results from different methods of treatment. He had in individual cases seen considerable benefit from various forms of treatment, he had seen tabetic pains relieved like magic from few doses of chlorid of aluminium in a single case, but it has been of no avail in others. He had seen most of the symptoms of *tabes* disappear after a few days of rest and a few doses of gentian—in one case. When about a year ago the suggestion was made of giving intraspinal treatment, he was ready to try it but was skeptical. Dr. Sanborn had kindly consented to come to this meeting, and he will speak on the technique and state the results. Dr. Knapp had tried this treatment in 18 cases of *tabes*, giving about 60 or 70 injections. He had not seen any bad results, he had seen no recurrences. He had of course seen unpleasant reactions sometimes, some little rise in temperature. He had known patients to complain of great pain after the injection for two or three days, but the ultimate relief has been so great, that they are willing to stand the pain again. After three or four injections by the intraspinal method the injection has not caused increased pain. He had seen two helpless tabetics, who are walking about now, showing comparatively little disturbance of gait; they can walk considerable distances without much

trouble. Out of five cases of paresis, in two he had seen considerable improvement. One case, a man thoroughly demented, who for three years after the onset of his trouble acted as a pilot on the New England coast, when asked the question "Who is the President of the United States," could give no answer, but now, after treatment, can answer correctly. He knew another man who presented the characteristic mental euphoria, characteristic handwriting and the characteristic spinal fluid changes; he had improved so much that when Dr. Knapp last saw him, the mental condition had changed entirely and his handwriting, which was a perfectly typical paralytic handwriting, is now the handwriting of an ordinary uneducated man.

Dr. Knapp said that in spite of the efficacy of suggestion of which Dr. Dercum speaks, he had never found a suggestion that worked as well as salvarsan. The last few months he had not been giving any mercury or iodine in connection with salvarsan.

Dr. F. W. Langdon said that by way of a small contribution to the statistical element, he would report that he had had under his care during the past year, twenty or twenty-one cases of paresis, where they could be closely and continuously observed (in the Cincinnati Sanitarium). They had all received salvarsan or neo-salvarsan treatment, carefully checked and controlled by Wassermann and Noguchi methods, by Dr. North, who is a skilled diagnostician, as well as technician. They had been very fortunate in having no untoward results or accidents. Of the cases mentioned, fifteen have already appeared in the literature (*Cincinnati Lancet, Clinic*, 1914).

Their experience co-incided with that of Dr. Sachs. There was noticeable improvement in nearly all, and remarkable improvement in two or three cases. The general clinical aspect, the blood state and nutrition had improved; the patients were mentally clearer as a rule. *In no instance* had there been any *modifications of organic symptoms*, such as ocular or pupillary changes; or of defective knee-jerks. Two of these patients had resumed business under proper restrictions and their improvement had continued for several months.

Dr. Langdon's present conclusions are:

1. The results as a whole appear to justify the treatment. It is the best we have had up to this time.
2. No case of paresis or of tabes treated by us, can be considered cured at this time.

He would add a word of caution about the reckless or too free use of salvarsan or neo-salvarsan:

He was consulted recently by a physician, in active practice, about 45 years of age—whom he had seen to be well mentally within three months. This man had an acute neurasthenia with widely distributed pains and paresthesia—and a *speech defect*, that suggested strongly the existence of paresis. He had contracted a chancre on a fore finger, within a year or two, and had received seven salvarsan and neo-salvarsan injections, within a year or less—some by good advice and checked by Wassermann methods, others on his own initiative, without advice or contrary to it. He had also medicated himself pretty freely with mercury. After three or four weeks of rest in bed with general nutritional measures, he recovered his speech, his pains diminished, and his general strength was much improved.

Dr. Langdon presumed his pains and perhaps the speech defects were

due to an abortive neuritis, from over-dosage with arsenic and mercury; merely one more example of the effects of "too much of a good thing."

Dr. Bassoe wished to call attention to some isolated experiences with the Swift-Ellis treatment. The first instance was in connection with a case of tabes in which the diagnosis had been made by Dr. Sachs twelve years ago. Later this man developed optic atrophy and a typical Charcot joint of the lower lumbar spine. He had a few intravenous doses of neo-salvarsan without bad results, but after the first intraspinal dose he suddenly developed a partial foot drop on the left side. There had been a right-sided foot drop for several years which also came on suddenly.

In a second case, one of a mixture of cerebrospinal syphilis and tabes in a woman, there developed after an intraspinal injection a marked increase in the sensory disturbance in the legs and an increase in ataxia. After a couple of weeks the patient again improved and has had another intraspinal dose without any ill effect.

Dr. Bassoe wished to call attention to a case of general paresis of the simple dementing type of two years' standing with very marked improvement in symptoms from the beginning of the treatment, and note the interesting fact that the Wassermann test with the spinal fluid became negative at the time of the fifth injection; again positive with the sixth and negative with the seventh and last injection. In all of his cases there had been a decided reduction in the cell count.

Dr. Moyer said he was firmly convinced of the value of arsenic in the treatment of nervous syphilis. He began giving arsenic hypodermically in 1891, employing a solution of arseniate of sodium. Later cacodylate of sodium was proposed but he had not found it as efficient as the arsenate. When salvarsan was proposed it was extensively tried, and in the writer's experience it had not given as good results as the arseniate of sodium. He wished to be understood as referring only to the treatment of nervous syphilis.

Presumably it is the arsenic in salvarsan that is effective. As a means of introducing arsenic it is not as efficient as the arseniate of sodium. With the latter drug it is easy to obtain a maximum saturation of the tissues, by injecting it under the skin. The injections are painless, and free from irritation. They can be frequently repeated without discomfort.

Six years ago, he employed intra-spinal injections of $\frac{1}{4}$ grain of arseniate of sodium, for the relief of tabetic pains. He had found it a prompt and efficient remedy for this purpose. Ordinarily it is not necessary to use an intra-spinal injection, the repeated subcutaneous injections being sufficient.

There is a distinct advantage in combining arsenic medication with mercurials.

SUBDURAL ANASTOMOSIS OF THE ANTERIOR ROOTS OF THE SPINAL CORD

By Charles H. Frazier, M.D., and Alfred Reginald Allen, M.D.

An inquiry into the problem of regeneration after division of the roots and their anastomosis by various methods, sutures, fusions, etc. Consideration of the formation of adhesions after subdural anastomoses and their effect upon regeneration. After complete division of the motor roots of the spinal cord within the dural sac is physiological regeneration possible? A review of the indications for intradural anastomosis and its feasibility in the several spinal segments.

Dr. Adolph Meyer inquired as to the condition of the central horn cells in these specimens. We know from experiments that the closer the axis cylinder lesion comes to the cell body (as in the pulling out of nerve-roots), the greater is the chance for a final degeneration of the whole neurone-unit; and the further from the cell-body we make the lesion, the more certain can we be of regeneration. The reaction of the cells is therefore one of the primary questions in the results of such an experimentation.

Dr. Allen said he was glad Dr. Meyer has brought up that point. It is rather difficult to answer because all of their sections were made longitudinally. The nerve cells found were very evidently not the nerve cells that gave origin to the roots used; in other words they were not in the block of tissue. Dr. Allen hoped to recover this point in future work and attack this problem from the cross section of the cord taking in the nerve cells of the area furnishing the proximal portion of the anastomosed roots.

PUNCTURE OF THE CORPUS CALLOSUM AS A DECOM-PRESSIVE MEASURE

By Charles A. Elsberg, M.D.

The significance of increases of intracranial pressure and the effects of increased pressure upon the brain tissue; the frequency of internal hydrocephalus in intracranial newgrowths and its bearing upon states of increased tension within the skull. The principles upon which cerebral decompression should be based and the advantages of puncture of the corpus callosum as a decompressive measure. Description of the method, and results obtained. (With lantern slide demonstration.)

Dr. Allen Starr said he had been very much discontented with the ordinary results of temporal decompressions in cases of brain tumor. In the London congress last year, it was stated that ten per cent. of brain tumors can be operated on with success and that leaves us with 90 per cent. that we cannot hope to cure surgically. Here is an operation which affords a certain measure of relief in 90 per cent. of cases. Where you simply remove a portion of bone, you get a condition of invalidism almost as bad as the disease; hence we must welcome this procedure that Dr. Elsberg has brought before us so clearly and convincingly. Dr. Starr saw a number of cases in Baltimore, in Vienna and also in Munich last year where the puncture had been made and he found on the other side this suggestion had been received with great faith by many of the surgeons and neurologists. It has never been done in this country as much as it should be done. We owe a debt to Dr. Elsberg for having brought the subject before us and demonstrated what is so radical and legitimate a means of relief. Years ago in writing, Dr. Starr pointed out the fact that in a vast majority of cases, the general symptoms in brain tumor producing the greatest amount of distress, headache, vomiting, many times convulsions, are only present in the cases where hydrocephalus is present.

Those who will look over records will be convinced that the brain tumors that present few symptoms and cause little distress lie on frontal lobes, and may go on many years without developing hydrocephalus. But a little tumor in the cerebellum or in such a position as to compress the fourth ventricle produces hydrocephalus, and then causes violent symptoms.

Dr. W. M. Leszynsky said that in the case of a girl sixteen years of

age under his observation, with severe headache, vomiting and choked disks of high degree, without any focal symptoms, a subtemporal decompression was performed without evident improvement. One week later the corpus callosum was punctured. Within twenty-four hours bilateral and almost complete ophthalmoplegia developed, indicating a probable hemorrhage into the corpora quadrigemina. The general symptoms of intracranial pressure were much relieved, but the patient died from exhaustion about six weeks later.

At the autopsy, a large glioma was found which involved the right temporosphenoidal lobe, with hemorrhage into the tumor and the corpora quadrigemina.

Dr. B. Sachs confessed that callosal puncture has not appealed to him very strongly. He also stated, particularly owing to frequent talks with Dr. Elsberg, he had tried to approach the subject with an entirely open mind. He wished without any special criticism of the entire proposition to put these few points before the association. First of all the actual physics of the intracranial cavity is a very difficult subject. He could not say he was thoroughly convinced that the physical condition of the cranial cavity is more favorable after callosal puncture than after temporal decompression. The operation itself done skillfully, as done by Dr. Elsberg, is not a serious operation; on the other hand one can tell from the slides shown that it is an operation which may be followed by serious results. One is working a little in the dark. It is readily seen that it is a laceration of the brain and one is working very near dangerous blood vessels, the actual results of that puncture may at times be a little more serious than would appear from first discussion of the subject. The great advantage of the temporal decompression is that one knows what is done and can see exactly. Of course the hernia that sometimes follows is very disagreeable but probably does less injury than laceration might do in some cases. It is a question whether there are some cases in which there is considerable hydrocephalus in connection with brain tumors, and whether the puncture is going to be of great benefit, and whether there is not going to be just as much dragging of brain tissue inwards in consequence of a depletion of the brain. Another point that is to be settled, is, does this opening remain patent? Is it really a permanent drainage?

Dr. Ernest Sachs said that usually or very frequently the posterior fossa tumors are associated with internal hydrocephalus and these tumors constitute a large group of all brain tumors. This procedure has one serious objection, which in intracranial work we must keep in mind, that is, the intracranial surgeon must more and more get to the point that he must not injure brain tissue. Dr. Sachs granted we do not know very much about the function of the corpus callosum; still we must try not to destroy this structure. Here is a procedure in which you are deliberately doing this. Dr. Elsberg says he makes a tear deliberately destroying brain tissue and destroying the function of the part. To get the best results we must persist along lines in which we will possibly not injure brain tissue at all; that is the reason in the last few years men like Cushing and others have gotten such brilliant results, because they have introduced methods of handling brain tissue which prevent to a very considerable extent the injury to brain tissue.

Furthermore, if this method is going to come into general use, it is going to put us back to where we were five or ten years ago, and where

no radical attempt to remove brain tumors was resorted to. If this procedure is followed it is going to reduce symptoms arising from the hydrocephalus and the tumor is going to be allowed to grow. Further, Dr. Elsberg made a statement that this was a procedure to be used in the inoperable brain tumor; nobody can assert that a tumor is inoperable until the skull is opened and the tumor inspected. The severity of the symptoms give no clue to the size of the tumor.

Dr. Strauss believed there is no doubt that in some cases the measure has been one of great benefit. When, however, you come to introduce this method as a means of relief in brain tumor it opens the question again as to how often you have internal hydrocephalus in these cases. You may have noticed in the slides that in those cases where the tumors lie in the region of the basal ganglia there was comparatively little hydrocephalus. He recalled one such case in which Dr. Elsberg did the puncture and after operation there was considerable relief. This only lasted two or three months when all the symptoms recurred.

One may have noticed where decompression has been done that there remains a great deal of hydrocephalus, in such cases the puncture would be one of distinct benefit. Dr. Strauss had had the opportunity of examining one case two times in three weeks after the puncture, but could not find the opening.

Dr. A. S. Taylor said his experience has been limited to hydrocephalus cases. Each of the different methods of treatment of hydrocephalus proposed has had a few successful cases. He remembered his first one—in that the child was practically well for two or three years; the next fifteen cases died. He tried six consecutive cases of hydrocephalus by this puncture method; they lasted two or three weeks and then death occurred. Unfortunately there was no necropsy. In order for this operation to have a permanent standing in neurological surgery it must be demonstrated that the artificial opening remains stationary, and that the fluid will come through it to the surface of the brain and be absorbed. Of course the brain is practically a liquid medium.

Dr. Knapp agreed with Dr. Sachs that in many cases of tumor, the importance of hydrocephalus as causing symptoms is very slight. In such cases the amount of relief from callosal puncture is not great. With great intracranial pressure, the whole brain may be driven into the foramen magnum, and we can plainly see the depression and distortion of the brain and cerebellum. How much fluid can be absorbed by the cortex Dr. Knapp did not know, but the possibility of drainage under those conditions is rather precluded. The difficulty in cases of extreme intracranial pressure is that we do not get enough relief from decompression by the ordinary subtemporal method. Dr. Nichols and he had both agreed that where intracranial pressure is very great they could not get enough relief by carrying out any subtemporal method exclusively, but they had to take off a very large piece of the skull and give room for expansion.

Dr. Mills said that before the puncture of the callosum you have two closed cavities, one intraventricular, the other extraventricular, containing a certain amount of fluid, the whole being adjusted on certain well known mechanical and general principles. If you make a permanent opening, you simply make these two cavities one. There will be relief at once—temporary relief, so far as the intraventricular pressure is concerned. In the case of hydrocephalus soon readjustment would occur and he could see no clear reason why cortical absorption to a marked extent should take place because of the changed relations of the two cerebrospinal cavities.

Dr. Kramer said it is difficult, if not impossible, to understand how puncture of the corpus callosum can diminish the hydrostatic pressure inside the cranium. One simply transfers fluid from the ventricular system to the subdural cavity and unless it can be shown that this leads to increased absorption, there is nothing to show that the pressure will be relieved. On the general question of decompressive operation, he wished to add a few words, the result of his experience. One should at all times endeavor to make a topographical diagnosis and if possible decompress over the site of the tumor, and not to be satisfied with a simple decompression at a point of election. When this cannot be done, then in his opinion, the decompression should be done over the posterior fossa and the dura incised. When the decompression is done in the parietal region or subtemporal region there frequently follows, particularly if the tumor is large, a tremendous deformation of the brain, by reason of the fact that a large portion of the hemisphere is pushed out through the opening. Frequently as a result of this the internal capsule is interfered with, and we have a post-operative hemiplegia, and our patient is worse off after the operation than he was before. The great problem which is sought to be solved by the decompressive operation is the prevention of blindness. If one opens the posterior fossa the subarachnoid cistern is opened; there follows an enormous meningocele without hernia of the brain, an auxiliary lake for the cerebrospinal fluid is provided and a maximum of relief of hydrostatic pressure on the sheaths of the optic nerves is produced.

Dr. Elsberg said there has been no greater stimulus to him to learn the real value of this operation than the many objections raised against it by Dr. Sachs and his other colleagues in New York. No matter what the theory of hydrostatics, this fact cannot be gainsaid: he had had thirty cases and in more than half of them the general symptoms have been markedly relieved by means of callosal puncture. No matter what the pressure conditions within the skull, the operation did do good. Where, however, there was no internal hydrocephalus, puncture of the corpus callosum was useless. In a collection of five hundred cases of brain tumor, in 75 per cent. there was more or less hydrocephalus. He could not at all agree that this is an operation that could interfere with a later radical operation. What he did say is that when a decompressive operation is indicated, then puncture of the corpus callosum is frequently useful. It need hardly be stated that radical removal of the tumor should be done whenever possible; decompression has its field as a temporizing method or in nonremovable or unlocalized intracranial neoplasms. Callosal puncture may, of course, be combined with unilateral or bilateral subtemporal or suboccipital decompression.

As regards the statement that the operation is dangerous: von Brahmman did fifty-seven operations without any ill effect. Dr. Elsberg had done thirty-nine without mortality. Of course, if the operation is not correctly done, trouble might ensue. It is a simple procedure. Regarding the statement that it is incorrect to cause any injury to brain tissue, he said that,—if correctly done—no deleterious symptoms have been observed.

The real value of this method of callosal puncture is not yet settled, but he thought that this new decompressive method has advantages, and it should be tried. No matter what the theoretical considerations against it, in practical use, he has been able to benefit a number of patients by this simple method of puncture of the corpus callosum.

(To be continued)

Translations

VAGOTONIA

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER AND DR. LEO HESS

OF VIENNA

TRANSLATED BY WALTER MAX KRAUS, A.M., M.D., AND SMITH
ELY JELLIFFE, M.D., PH.D.

(Continued from p. 665)

It is but natural that there are not many who will show all the signs and symptoms which have been described, yet we have found types which nearly do. It is interesting to add that vagotonia may be a family stigma.

The term which we have coined for the constitution showing an overactive or overirritable autonomic system is *General Vagotonia*, and we feel that this must be distinguished from *Local Vagotonia*, in which vagotonic symptoms are to be found only in some single system of the body, nor is it a matter of little interest that vagotonia may be very marked in but a single branch of the autonomic system, in accord with the physiological divisions.

Cases have been found in some of which the cranial, in others the cervical or sacral parts of the autonomic system show the most marked signs of irritation.

B. PATHOLOGICALLY INCREASED VAGOTONIA

Pharmacological testing of various individuals shows that after the administration of pilocarpin conditions occasionally result which resemble very closely certain entities which we have learned to recognize clinically. Thus, after such an injection, gastric symptoms appear resembling those of hyperacidity, or those of pylorospasm, or cardiospasm, or it may happen that heart symptoms resembling mild angina pectoris are found. In other cases, there are respiratory disturbances, salivation or even asthmatic attacks. In connection with the injection diar-

rheas, urgency in micturition or defecation, spermatorrhea, lachrymation, ptyalism or sweating may also appear.

These manifestations following pilocarpin injections lead us to believe that such diseases which in their fully developed form are known as angina pectoris vasomotoria, bronchial asthma, cardio or pylorospasm, gastro-succorrhea, gallstone colic, tenesmus, etc., are genetically related to each other, inasmuch as they all may be induced by toxic agents which act upon the autonomic nervous system, and furthermore it would seem that they are both made manifest due to the basic vagotonic disposition of the patient which favors their appearance. In many cases, it is demonstrable that not only will atropin relieve the symptoms of the disorders just mentioned, showing that they are due to vagal irritation, but that latent manifestations of vagal irritation come to the surface in branches of the autonomic system other than those primarily involved in the disease.

Bronchial Asthma.—That the asthmatic paroxysm, with its characteristic expiratory dyspnea, and its tenacious sputum filled with eosinophils and Charcot-Leyden crystals, is due to vagal stimulation has already been stated. It may be worth repeating here that peripheral stimulation of the vagus in animals will produce asthmatic attacks with bronchiospasm. In one case v. Schrötter, Jr., while performing laryngoscopy, saw a sudden narrowing of the lumina of the bronchi. This necessitated stopping the examination. Subsequently there developed a quite typical attack of asthma. This so-called nervous asthma is to be compared to those cases in which the vagal irritation is due to some local anatomical stimulation, as enlarged bronchial lymph glands due to tuberculosis or to carcinoma of the bronchi (A. Schmidt).

In connection with the asthmatic attacks there may be nervous symptoms referable to other branches of the vagus, such as sweating, dermatography, urticaria factitia, bradycardia, sometimes lowered blood pressure, uncomfortable feelings in the stomach or intestines, positive v. Graefe, or laryngospasm due to closure of the rima glottidis. That the pulmonary branches of the vagus are over-irritable, may be shown by the variations in pneumographic curves taken between attacks. Besides it may be shown that after deep inspirations the spirometric curve does not sink at once, but descends gradually to its former level. As asthma may be

relieved by atropin or adrenalin, so also may the symptoms which accompany it. Laryngospasm is closely related to asthma and we are surprised that atropin has not been tried for relieving this condition in children. The most severe form of laryngospasm is found in tabes, usually as an early symptom and, as we have been able to observe, this is frequently associated with other symptoms of vagal irritation as lachrymation or sweating.

Vagotonic Diseases of the Stomach.—Stimuli may act upon the autonomic neuron supply to the smooth muscle and secretory apparatus of the stomach, and may produce pathological states of the same nature as are found when the autonomic system is in a state of increased irritability. The severity of the subjective symptoms is frequently the only deciding point, since we have found that the objective signs in the stomach are the same whether the patients complain of them or whether they are found during clinical examination for the purpose of finding vagotonic manifestations. Frequently we find the pathological condition gradually modifying itself into a pure vagotonia. This applies particularly to motor neuroses. In a series of cases showing signs of vagotonia outside of the domain of the stomach, and in which patients complained of pressure in the region of the stomach, rumblings in the stomach or cutting pains after eating, the X-ray examination showed that the peristaltic action of the stomach was much increased. Often we observed that the stomach filled slowly; as soon as the bismuth appeared at the fundus there appeared a strong wave of peristalsis which apparently cut the bismuth into two parts. Not infrequently, the stomach seemed to be separated into three ball-like partitions. This condition may be observed for varying lengths of time. Sometimes the stomach emptied promptly without there being any lengthening of the usual time. In other cases, antiperistaltic movements appeared before the stomach emptied itself. This pointed to a spastic condition of the pylorus, particularly since there was as a rule no evidence of motor insufficiency. These conditions are sometimes so plain that they may be seen on the surface of the abdomen. But since they are, as a rule, associated with an increase in the tone of the gastric musculature, they are not always observable on simple inspection of the surface of the abdomen. Yet it is just in these last mentioned cases that we find a valuable point of differential diagnosis from the increased peristalsis due to mechanical obstruction.

I. H., a girl aged 27, who had previously been treated for "stomach trouble," has since an emotional shock been vomiting everything which she has eaten. At the same time she has suffered from hunger. As soon as she eats, she experiences a feeling of pressure in the region of the stomach. This feeling leaves as soon as she vomits, which usually takes place 3 to 4 minutes after eating. After being six weeks in this condition, she has lost considerable strength. The girl looks much emaciated and pale. The glands of the neck and throat are enlarged. The pharyngeal reflex is absent. Pulse rate 64 to the minute, which does not increase during vomiting or after the excitement subsequent to it. There is pulsus irregularis perpetuus. Eosinophils 4 per cent. Marked dermatography. Stools while the patient was well were always small in amount, and sometimes covered with mucus. The patient was costive, though always being used to it she never found this condition a cause for complaint. X-ray examination of the stomach showed that the bismuth passed rapidly through the esophagus to the stomach. The meal remained longest in the fundus. Though the patient ate quite rapidly and the fundus dilated considerably, there was but a small strip of bismuth visible at the caudal end of the stomach. The picture changed but little after 3 to 4 minutes and no bismuth was forced toward the cardia. The patient soon complained of severe pain, and gradually peristaltic waves appeared in the fundus, after which (vomiting became imperative) the patient had to vomit. Some of the bismuth remained in the stomach. After the lapse of about an hour, shadows of bismuth were seen in the pyloric region. A test meal was impossible. There was no blood in the stool.

The patient was given .001 grain of the sulphate of atropin daily. On the day following the commencement of this therapy, there was no vomiting. An X-ray showed that the bismuth meal was still held in the fundus for a considerable time, but after three minutes passed caudadwards (towards the pylorus) in a strip a finger's breadth in size. As this strip gradually widened, the mass passed on to the pylorus. This was reached in eight minutes, whereupon strong peristaltic movements began. There is but small wonder that on the basis of a faultily interpreted X-ray this case seemed to be one of hour-glass stomach and gastric ulcer before it was more carefully examined in the clinic. Atropin therapy was continued. In three days she could eat everything, and in five more left the hospital cured.

At the beginning of this section we called attention to the physiological distribution of the ingesta of the stomach. In many cases the sojourn of the ingesta at the entrance of the pars media is so long that a single roentgenological inspection readily gives the impression of an hour-glass stomach. This spastic hour-glass stomach is found now and then in those who complain of the most varied functional gastropathies. And it is only too frequently that one hears these patients say that they can eat but small amounts of food at a time, or that they must stop eating during meals to prevent pain or even vomiting. When the beneficial action of atropin is seen in such cases, and its effect upon the X-ray picture, it becomes apparent that there must be some relation between autonomic stimuli and gastric neuroses. The recognition of this relationship is of particular diagnostic importance

since symptoms similar to those found in these functional gastro-pathies are also found in gastric ulcers. Not only is this true, but it is also true that both ulcer and neurosis may be found together.

A. K., a shoemaker, 45 years old, has been complaining of vomiting during the last five months, while previous to that he had always had stomach trouble. Recently he has been vomiting blood-tinged material. Since blood was always found in the stool, since the vomitus was found to be very acid, and since X-ray examination showed that the bismuth meal remained a long time in the fundus, and did not move on after 3 to 4 minutes, a diagnosis of gastric ulcer and hour-glass stomach was made, and an operation was performed. On opening the abdomen it is true there was a large ulcer on the lesser curvature while not the slightest evidence of hour-glass stomach was found. It is certain that more careful investigation of the case with subsequent atropin therapy would have eliminated this gastric error.

The symptom complexes of what seem to be nervous cardio-spasm or pylorospasm are frequently found as diseases associated with general vagotonia. And here too the variability of the accessory symptoms is very striking, in that they occur sometimes in one, sometimes in the other part of the autonomic nervous system. At any rate it was noticeable that a relationship to vagotonia had to be considered in all the hyperkinetic neuroses of the stomach. The opinions of many authorities on the favorable action of atropin upon the gastric neuroses speak in favor of our view of this question. This opinion we can confirm and can recommend this remedy in all hyperkinetic gastric neuroses. Besides this, we feel that all those neuroses which are associated with increased gastric secretion are referable to stimuli from the autonomic nervous system. As in the discussion of motor disturbance so here also do we find there are often great difficulties in distinguishing between true pathological conditions and those which are but part of a general constitutional make-up. The symptom hypersecretion or hyperacidity alone cannot be the only one to give trouble. As we shall show later on, the symptoms of gastric hypersecretion are often associated with those of hyper-tonicity. The more symptoms referable to autonomic stimuli which we find the more readily may the diagnosis of such cases be made. Later we shall remark upon what seem to be exceptions to this rule. When one observes how the signs of increased activity of smooth muscles and of glands particularly of the stomach seem not unlike in both normal and pathological conditions, and can be distinguished only by the subjective sensations

which give rise to the trouble, one is convinced that in the truly pathological condition some further condition must exist. Since in some cases hyperesthesia cannot be overlooked, the possibility presents itself that the sensibility of the stomach plays a considerable rôle. This opinion is partially confirmed by the observation that individuals who complain of the most varied types of gastralgias and who in addition have hypermotility and hypersecretion obtain great relief for their pain through analgesics, but none for the objective hyperkinetic symptoms. The newer results which have been obtained by the Förster operation in the gastric crises of *tabes dorsalis* strengthen the belief that sensory stimuli are of the greatest importance in considering gastropathies. Briefly it may be stated at this point that in many vagotonic states of stimulation there are found areas of hyperalgesia in the zone described by Head. There is, however, no reason to believe that there exists any relation between vagotonia and a lower threshold to pain, in spite of the fact that these two manifestations occur together so frequently.

Dreyfus in an interesting review of nervous dyspepsias comes to the conclusion that in practically all cases which are truly of this group there is a psychoneurosis, and that this psychoneurosis is the primary cause of the condition. In the conclusions of his article he says, "The great question is now as it was before, how are the psychoneurotic conditions in the stomach produced, and how is it that they occupy the foreground"? When Dreyfus goes on to say "On that point we must admit not having a reply," we feel that the question is to be answered in laying the blame on a constitutional disposition to vagotonia. The histories of some of our papers have made this certain to our minds.

In conclusion, we wish to ask the question, why in some cases in which we find marked objective signs of vagotonia, as powerful gastric peristalsis and hyperacidity of marked degree, that some complain of gastralgia while others do not have the slightest complaint to make? When we consider that both the autonomic nervous system, and the sympathetic nervous system come together in the central nervous system, and when we realize that not only stimuli but also inhibitions (cf. Psychoses) come from them, we must not forget that in nervous disturbances of visceral nature, pathological conditions in the central nervous system cannot be left out of account.

Nervous Diseases of the Intestines.—Nervous conditions, due to increased irritability, are more often found in the domain of the intestinal tract than in any other visceral organ. Almost on the border between the normal and the pathological are those cases in which an over-irritable individual after some strong emotion as fear or excitement, or after bodily exercise, as a railroad trip, or after being exposed to the cold, reacts with one or more fluid stools. These cases are surely not of organic basis, since the diarrheas disappear too rapidly, the course of the disaffection is afebrile, the appetite is undisturbed, and the patient as a whole feels excellently. The mildest form of this intestinal disturbance is found when, after one or another of the above-mentioned conditions, there ensues, in the absence of all pain, one or two fluid stools.

These diarrheas rarely last longer than twenty-four hours. When they do last longer they suggest the idea that what was in the beginning purely a nervous or functional disease has lost this character and has become an inflammatory disease of the mucous membrane. Those cases with nervous digestive weakness of the intestine, which Moebius first described, belong to this category. This disease affects neurasthenic individuals. They have several stools a day which are excessive in amount and either normal or very fluid in consistency. Pain is never a complaint in their connection. The transition from this condition to that of the chronic neurogenic diarrheas first described by Trousseau is readily understood. The fact that those who are afflicted with these abnormal conditions show signs of vagotonia in viscera, other than the intestines, seems to us to be very significant in the description of the malady. Besides this there is the evidence obtained by a comparison with the pilocarpin test. It is scarcely necessary, at this point, to reemphasize the fact that various vagotonic manifestations may help us in diagnosing such a state in the intestines, *i. e.*, *neurogenic diarrhea*. Counted among these are, briefly, cardiac palpitation, accompanied by a feeling of anxiety, a general feeling of pressure in the chest, breathlessness and the sensation of not being able to expire, transient facial and general body hyperemia, tenesmus and, often, hyperacidity. Related to the group of neurogenic diarrheas are states of intestinal peristaltic unrest. Individual experience has taught us of the active rumblings resultant upon intestinal activity. Under pres-

sure of some nervous excitement, whose outlet travels most readily by way of the vagus, these intestinal movements assume the intensity of the so-called *peristaltic unrest* of the intestine. This is limited to the small intestine and does not manifest itself as a diarrhea, but as noisy rumblings and, in the case of individuals with thin abdominal walls, as visible intestinal movements, most readily made out in the umbilical region. Certain therapeutic measures cure those neurogenic diarrheas seen in Basedow's and Addison's diseases. Opium and astringents are, as a rule without effect. Atropin is not a good drug to use in Basedow's disease since, even when administered by rectum, it spreads very rapidly through the body and produces undesirable by-effects. Belladonna preparations are of more service. Adrenalin enemata produce very gratifying results (20-30 drops of a 1-1000 solution in 5-10 ounces (150-300 c.c.) of water). Adrenalin, even when given in large amounts, is but slowly absorbed from the intestinal tract, and gives no undesirable symptoms, never producing a tachycardia, while it does seem to diminish peristalsis when locally applied.

This same therapy is applicable to the diarrheas of Addison's disease, provided they are due to toxic conditions and not to tuberculous ulcers or intestinal catarrh. The varying behavior of the evacuations occurring during tuberculous ulceration of the intestines shows how large a rôle the neurogenic factor, that is, the irritability of the autonomic nerves to the intestines, plays in the production of diarrheas. There are cases of tuberculous ulceration of the intestines, which lead to uncontrollable diarrheas, while there are others in which the regularity of the evacuations leads to not the slightest hint of any tuberculous disease of the intestine. That there is some degree of underdevelopment of the chromaffine system in tuberculosis and a consequent overirritation of the autonomic system, even though there is no question of Addison's disease, seems on the ground of many observations, to be without doubt.

Myeloid leukemia and many cases of lymphosarcoma (not only of the intestine, but of other regions) are often complicated at their beginning by a combination of persistent sweating and uncontrollable diarrheas.

(To be continued)

Periscope

New York State Hospital Bulletin

(Vol. 6, No. 2)

1. Provisions for the Care of the Insane; Pending Commitment in New York State. RYON.
2. Studies in Heredity in Two Families. CURRIE.
3. Depressions with Arterio-sclerosis. BREWSTER.
4. A Review of the results of a modified Vasectomy Operation. THOMPSON.
5. Personality and Psychosis. HOCH.
6. The Production in a Manic-like State Illustrating Freudian Mechanisms. McCURDY.
7. Report of the Inter-Hospital Conference of Physicians at Middletown State Homeopathic Hospital, April, 1912.
8. Report of the Inter-Hospital Conference of Physicians at Binghamton State Hospital, October, 1912.
9. Minutes of Quarterly Conference, June, 1913.

3. *Depressions with Arterio-Sclerosis.*—The author calls attention to an interesting group of cases of depression occurring in the involution period which appears to present in the beginning symptoms of involution melancholia, but in which the mental and physical impairment seems to be closely related to arterio-sclerosis. They have the familiar physical complex, thickened peripheral arteries, increased blood pressure, hypertrophy of the heart, accentuated second sound, characteristic renal findings and changes in the retinal vessels. The headache complained of is often frequent and persistent and appears not rarely to be influenced by changes in blood pressure, or by position. Depression and uneasiness often associated with irritability are frequently observed. These patients find difficulty in doing their work, and their store of memories is not completely at their disposal as formerly. Insight is usually expressed with brooding over their progressively failing powers, and they show a tendency to exaggerate their symptoms. Paranoid trends occur in some cases together with depressive delusions and at times, hallucinations. The author presents the histories of four cases, illustrating the above physical and mental symptom complex. He adds the caution that the individual constitution in considering these cases should not be lost sight of and says that the relationship between this and the physical symptoms of arterio-sclerosis is somewhat complex. Given an individual with a certain constitution, it is readily conceded that arterio-sclerosis may act as other exhausting factors in producing an attack of insanity. He feels justified because of the apparently close inter-relationship between arterio-sclerosis and the mental symptoms in considering these cases as a separate group.

5. *Personality and Psychosis.*—In this paper the author limits himself to consideration of this problem in manic depressive insanity and dementia præcox. Kraepelin's standpoint is quite representative of the general drift

of opinion. He admits, with many others, that in the mild forms of manic-depressive insanity, the psychosis appears to be a continuation of a further development of a somewhat peculiar personality, and the same is usually recognized for some other psychoses; for example, certain paranoias. On the other hand, he points out that in the more marked states of manic depressive insanity, the personality is so much submerged that we can no longer speak of any relationship between personality and psychosis. Kraepelin believes that in dementia præcox, the special personal traits, if any exist, cannot be of any great importance since the psychosis, like general paralysis, shows so much that is alike in the different cases, that the personal peculiarities completely recede to the background before those symptoms which are caused by the disease. In dementia præcox, regarded by many as a disease process and the constitutional element disregarded, the incentive to look for personal peculiarities, has for this reason not been very great. Most writers however, speak of a certain relatively small proportion of cases of dementia præcox which have shown certain peculiar traits more or less throughout their lives. After Adolf Meyer had formulated his conception of dementia præcox as a habit deterioration and therefore insisted on the importance of the personality in the genesis of the disease Hoch was able to point, several years ago, to the frequency with which certain characteristics were found in the individuals who later developed dementia præcox. It was found in two different studies that in as many as from fifty to sixty per cent. of the cases, the chief traits which had existed before the mental breakdown were those which Hoch at the time called "shut-in" tendencies—tendencies to which Bleuler has recently applied the term "autism"—and Hoch was also impressed with the fact that especially in the second more carefully searched group only a relatively small proportion of cases were found to have been quite natural, frank, open, and well balanced. Bleuler comes to the conclusion that with adequate anamnesis it is rare not to find personal peculiarities before the onset of the psychosis and also speaks of the large percentage of the type of personalities above mentioned. Ritterhaus has recently confirmed these observations. In patients who developed manic depressive insanity, it has been found that in a considerable number either hypomanic or depressive tendencies are found to be a personal characteristic throughout the lives of the individuals. They are described either as overactive, stirring, inclined to overdo, vivacious or as intense and easily excited, high strung and very enthusiastic, or sometimes as of violent temper, etc. On the other hand, other patients are described as inclined to blue spells, to fight battles over again, prone to worry over trifles, borrow trouble, etc. In some cases, a certain instability of mood was also noted—the two extremes of emotional reaction are found in these persons. Of 218 cases observed, the elated type was found in 18 per cent., and the depressive type in 26 per cent. In the patient who had more preëminently manic attacks, the hypomanic traits of the personality predominated very greatly over the depressive traits; while in the cases which showed essentially depressive psychoses, the depressive tendencies of the personalities predominated very greatly over the hypomanic tendencies.

In dementia præcox, among the individuals who developed psychoses belonging to this group the number of abnormal personalities is much larger than is generally supposed. Many psychiatrists regard dementia præcox as a circumscribed disease process due to some toxic agent. They either

disregard the question of constitution or do not give it much consideration in the formulation of the nature of the disease. It appears to Hoch that the constitutional factors should form the very starting point of all further discussion, because those factors in the group of degenerates, for example, are justly said to indicate the constitutional nature of the disorder; namely, the tendency to abnormal reactions through life together with the great importance which heredity plays in them. These factors are equally prominent in dementia præcox as in the other constitutional psychopathies.

There are certain similarities between the neuroses and dementia præcox. Of recent years much attention has been paid to the psychological mechanism of dementia præcox in order to understand many apparently bizarre manifestations of the disorder. One cannot help getting impressed with the fact that just as is the case in the neuroses, the apparently scattered productions have a definite meaning to the patient and is sometimes more transparent in dementia præcox than in the neuroses. It is possible to show that mental causes frequently bring about the attacks. Freud and Jung laid much stress on the similarity between the neuroses and dementia præcox, and Bleuler in his recent work on schizophrenia has called attention to the possibility of a psychological interpretation of many symptoms as well as to the precipitating mental causes at least so far as the acute syndromes are concerned, and Hoch's experience shows that while physical causes play their part in precipitating attacks as in the neuroses, the mental causes are the more prevalent and important. They need not be single occurrences or demand for adaptation, but situations sometimes of longer duration. We must expect to understand them only in their relationship to various trends in the patient's mind. We must admit that the psychoanalysis is the first systematic attempt to deal with the internal history or development of mental attitudes or reactions. Bleuler points out the frequency with which acute syndromes in dementia præcox are produced psycho-genetically, but assumes an underlined process of a different nature and caused in a different manner. To Hoch it is difficult to see why personal peculiarities and acute syndromes should not represent reactions, partly determined by demands of adaptation, partly by a constitutional inability to accomplish such adaptations. Bleuler believes that the autistic thinking in dementia præcox is more dissociated than that of normal day dreaming or of hysteria. To this, Hoch says that we have in the personalities who develop dementia præcox a tendency to reactions which interfere with the compact with and the reference to reality. This marked turning away from reality explains the greater deviation from logical thinking which means thinking adapted to reality, and determined by the relationships in the world of phenomena. It is difficult to regard from the same aspect the functional recoverable neuroses and dementia præcox, which leads to deterioration. This argues against the functional nature of the disease. The rather uncertain conception of functional disorder means that the lack of adjustment does not go beyond a swinging back to normal activity. We lay stress upon the recoverability which is of great practical importance, but we do not know whether it is of fundamental significance as far as the nature of the disease is concerned.

In dementia præcox the anatomical studies of the brain sometimes reveal actual defects of development, and dementia præcox seems more often associated with congenital intellectual defects than manic depressive insanity or the neuroses. The intellectual defect is not an integral part of

dementia præcox but seems more frequently associated with it than with the other disorders. Anatomical changes in dementia præcox are very difficult to interpret. There is no reason to disregard the similarities between dementia præcox and the other constitutional psychopathies, and transitions from dementia præcox to the other constitutional disorders are difficult to deny. Manic depressive insanity often represents an increase of a reaction type. Peculiar traits of personality are more frequent in dementia præcox than in manic depressive. It appears there is reason to regard the relationship of personality and psychosis even in dementia præcox from the point of view of faulty development, or defects of adaptation, which often shows itself in definite symptoms throughout life.

6. This article does not lend itself readily to abstraction.

LEAHY (Ward's Island).

Review of Neurology and Psychiatry

(Vol. XI, No. 10)

Direct Trochlear and Crossed Oculomotor Fibers. L. J. KIDD.

The writer's conclusions, after a review of the subject, are as follows:

1. We have embryological, experimental, and pathological proof of the existence of direct (uncrossed) trochlearis fibers, ranging from the ancestors of elasmobranch fishes up to man.

2. Direct trochlear fibers are few in number: the crossed have increased enormously in the course of phylogenetic development. In cat embryos direct trochlear neuroblasts are primary, the crossed are secondary (Martin).

3. We have anatomical, experimental, and pathological proof of the existence of crossed oculomotor roots and fibers in fishes, amphibia, birds, and mammals up to man.

4. All the fibers in each muscular branch of the oculomotor nerve—with the exception of that to the internal rectus muscle—were primitively direct; their crossed fibers are secondary.

5. The writer believes that the direct and the crossed fibers of the oculomotor nerve are distributed as follows: the inferior oblique receives a few direct and a large preponderance of crossed fibers; the superior and the inferior recti mainly direct fibers, with a few crossed; the internal rectus exclusively crossed fibers, all of which come from the contralateral oculomotor nucleus; the levator palpebræ superioris probably a large majority of direct, and a small minority of crossed fibers.

6. In all ocular nerves and nerve-branches the grouping of the muscle-afferent nerve-fibers corresponds exactly with that of the motor fibers in that nerve or branch: thus the obliques have mainly crossed, the external rectus wholly direct, and the internal rectus wholly crossed fibers, etc., etc.

7. There are no fibers in man or the rabbit going from the abducens nucleus, *via* the posterior longitudinal bundle, to the contralateral oculomotor nucleus or root.

8. The lower (infra-cortical) mechanism for the lateral conjugate eye-movements depends on the ascending vestibulo-ocular fibers of the posterior longitudinal bundle.

9. A lesion strictly limited to the cells of one abducens nucleus gives

exactly the same signs as one of the abducens root or nerve, viz., a palsy of the homolateral external rectus muscle.

10. A complete cellular lesion of one trochlearis nucleus gives bilateral signs, viz., a slight paresis of the homolateral superior oblique muscle, with an almost complete paralysis of the contralateral superior oblique.

11. Great caution is needed in diagnosing nuclear oculomotor lesions on account of our gross ignorance of the exact muscular destinations of the axons of all its cells.

12. The sterno-mastoid muscle probably receives a majority of crossed fibers, a minority of direct; this applies both to its motor and its muscle-afferent fibers.

13. A renewed experimental study is needed in monkey, cat, or dog: the rabbit should not be used.

14. As the upper path from the cortex cerebri to the nuclei of the eye-muscle nerves and to the nuclei of the motor nerves of the sterno-mastoid muscle is believed to be wholly crossed, the lower path has to be a double one to the two obliques and the upper and lower recti muscles of the eyeball, and also to the sterno-mastoid muscle. If it were not so, the eye-movements could not be carried out in the way we know they are performed. If, however, the upper path were double, a single lower path would be sufficient and there could then be no possible need for any crossed fibers in either the oculomotor or the trochlearis nerve.

(Vol. XI, No. 11)

1. A Case of Toxic Exhaustive Insanity Associated with Chronic Suppurative Otitis Media, Labyrinthitis, and Extra-Dural Abscess. D. K. HENDERSON, WINIFRED MUIRHEAD and J. S. FRASER.
2. A Guide to the Descriptive Study of the Personality. With Special Reference to the Taking of Anamneses of Cases with Psychoses. A. HOCH and G. S. AMSDEN.

1. *A Case of Toxic Exhaustive Insanity.*—A laborer, aged 42, with general weakness, rambling and incoherent speech, confusion and irritability, was admitted to the Royal Asylum, Edinburgh. He complained of headache and dizziness and hallucinations of hearing and showed a tendency to fall backward; he also dragged the left foot in attempting to walk. There was a purulent discharge from the left external auditory meatus. This had existed since boyhood. After a month in the asylum the patient recovered from his mental symptoms and was able to be about; but two weeks later he had during three days acute maniacal symptoms and died. Syphilis had been ruled out. On autopsy, no evidence of any abscess formation in either the cerebrum or the cerebellum, and no focus of infection were found. There was, however, an acute endocarditis and secondary congestive processes in the lungs, liver and spleen. These and the acute excitement seemed to be due to an acute extension of a toxic process in the left ear. A series of photo-micrographs illustrate the article. A chronic suppurative otitis media and an acute labyrinthitis were found. The inner ear, it is stated, had apparently been affected about three months. The infection seemed to have spread from the tympanic cavity to the labyrinth by erosion of the lower part of the basal coil of the cochlea. An extradural abscess of much more recent date than the labyrinthitis was found above and behind the labyrinth. The pus seemed to have spread from the vesti-

bule to the subdural space by eroding the crus commune of the superior and posterior canals, and thence to have extended forwards and outwards over the cochlea and vestibule. A functional examination of the vestibular apparatus and of hearing was not made before death. Other functional examinations of the ear were impossible on account of lack of coöperation of the patient.

2. *Descriptive Study of the Personality.*—This is intended to assist in obtaining accurate anamneses especially of this period of the patient's life in which the compensation had not started to break down, *i. e.*, of the so-called normal period and not of the actual disorder in the stricter sense. In this very period, however, there are milder traits of a defect of adaptation, which being singled out may serve as signals, warning of future nervous or mental ill health. The guide may prove useful in the study of abnormal and nervous children, and of problems in inheritance. The intelligence tests we have do not sufficiently size up the personality so far as the more affective reactions are concerned. The plan of the guide is as follows: An inquiry into traits referring to the intelligence field, forms a starting point in the sizing up of the personality. We try to get an estimate of the capacity of the subject for acquiring knowledge, of the traits referring to judgment, and of indications which the standing in school, or later in life, the efficiency in work, as well as the general sizing up of the individual's "sense" by his friends, etc., furnish us. The second section of the guide refers to the habits of the individual in the output of energy.

Before taking up the mood and the more specific adaptability to environment, it has been found advisable to inquire first into the subject's estimate of himself as expressed in such traits as self-reliance, self-depreciation, conceit, or self-pity, and the like. In studying the habitual attitude towards the environment we take up the more specific traits of the personality which stand as coefficients for good or poor facility for adaptation: in the first place, the more striking and the more general characteristics which, on their abnormal side, interfere in a definite manner with contact with the outside world, such as a general tendency to shun society. There are also traits which in a more specific but less obvious way accomplish similar results. Such traits are selfishness, suspiciousness, jealousy, etc. This leads over to traits from which we gather to what extent the subject lays bare to others his real self, that is, openness, reticence, and the like. Then we have taken up traits, such as conscientiousness and scrupulousness, which, in their normal development, are useful qualities, but which, in their exaggerated form, work somewhat in the same way as those just mentioned, or, at any rate, interfere with efficiency. In this connection also we have studied traits which indicate a tendency either to an active shaping of circumstances, or to the reverse. Such traits are an inclination to lead, courage, etc. Finally, it is important to consider the more specific traits showing the attitude towards reality—such as a tendency to be fantastic, to day-dreaming, etc.

The group concerning the mood, which stands next, aims at determining the habitual or episodic reactions of elation or depression, and also at what may be called the more allopsychic negative moods, such as irritability. To this are added somewhat related mental traits, with, however, rather less active reactions as a rule, such as sensitiveness, touchiness, and so on.

The group following that descriptive of the mood deals with the more

instinctive demands of the individual. Here are included traits which are more or less clearly related to the sexual instinct. Practical work has shown that it is wise to begin with affections of a sort which, on the surface at least, are not plainly sexual, such as friendship and affection for the members of the family. Then the more plainly sexual life is taken up—that is, the relation to the opposite sex, the character and frequency of love affairs, the attitude towards the partner in engagement and married life, the sexual demands proper, the attitude toward sexuality in general, including such traits as prudishness, and the like.

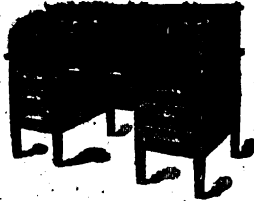
Finally we inquire into the subject's general interests—that is, his capacity for sublimation, his capacity for getting satisfaction from altruistic or higher interests, which represent important balancing factors in the mental economy.

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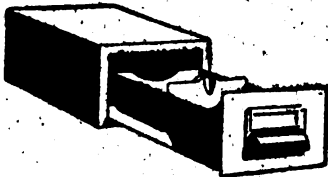
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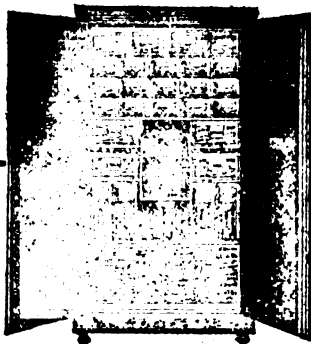
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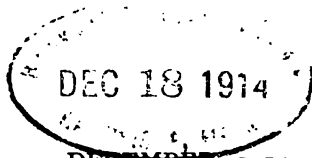
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VOL. 41.

DECEMBER, 1914.

No. 12

The Journal OF Nervous and Mental Disease

An American Monthly Journal of Neurology and Psychiatry, Founded in 1874

Original Articles

THE AUTONOMIC OR VEGETATIVE NERVOUS SYSTEM

BY WALTER TIMME, M.D.,

**CONSULTING NEUROLOGIST, NEW ROCHELLE HOSPITAL; CHIEF OF CLINIC,
NEUROLOGICAL DEPARTMENT, VANDERBILT CLINIC,
COLUMBIA UNIVERSITY**

There has existed much confusion in the past as to the nomenclature applied to this system and its various parts. Langley and the English school have called the entire mass of ganglia and nerve fibers, that supply the smooth muscle fibers, the glands, etc., together with their spinal and cerebral cells, the autonomic system, and have divided it into various parts, of which the thoracic portion is called the sympathetic. The term "autonomic" is given by them by virtue of the fact that the system can act independently of the cerebro-spinal. The Viennese school, Eppinger, H. H. Meyer, Gottlieb and others, have called the entire system that supplies the smooth muscle fibers of the body, the cardiac muscle, the glandular tissues, etc., by the term "vegetative" because through its means the normal continuity of life and of the vital functions is preserved. They agree with Langley that the term "sympathetic" should be reserved for that portion of the system that is represented by the gangliated cord on either side of the spinal column, with its ganglia and connecting fibers. Accepting Langley's classification as our own, we then have the following anatomic divisions of the "autonomic" system.

- I. Mid-brain autonomic division consisting of fibers and cells which emerge from beneath the anterior corpora quadrigemina, supplying the iris and ciliary muscle;

Chart No. 1.

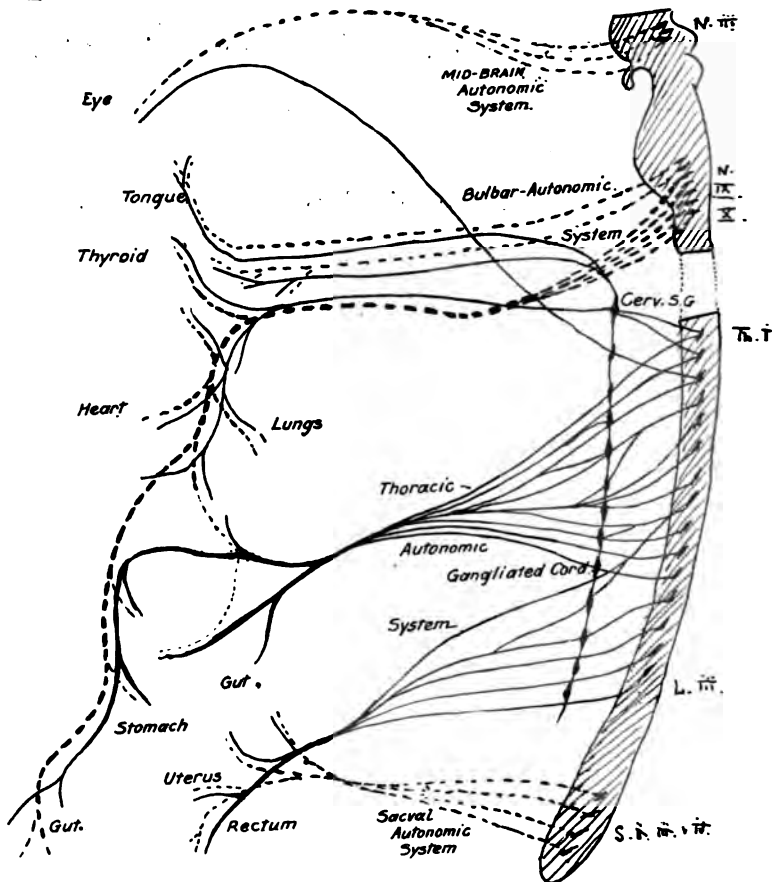


CHART NO. I Showing the distribution of the various divisions of the autonomic system. The double innervation by the sympathetic and autonomic divisions is indicated. Sympathetic fibres are indicated by unbroken lines, while autonomic fibres are dotted lines.

2. Bulbar autonomic, of which the fibers emerge from the calamus scriptorius region of the fourth ventricle, via the 7th nerve, nervus intermedius, 9th and 10th nerves, to supply the vessels and glands of the mouth, pharynx, nose, esophagus, stomach, small intestine, part of large gut, trachea and lungs;

3. Thoracic autonomic, or sympathetic proper, arising from the sympathetic cells of the cord from the 1st thoracic to the 4th lumbar segment, passing out via the white rami to the gangliated cord and its connections to supply the skin, arteries, muscles, glands, abdominal viscera, internal generative organs, etc., and the
4. Sacral autonomic, leaving the cord from the 1st to the 3d sacral segments, as the pelvic nerves, to the ganglia of the anus, rectum, descending colon, bladder, urethra, external genitals.

As far as the embryological development of the system is concerned it is agreed by all investigators that it originates, as well as does the cerebro-spinal system, in the ectoderm, and that it emerges from the edges of the medullary tube as this gradually closes.

However, there is still some difference of opinions as to whether it sprouts from the ventral or from the dorsal roots and with the latter from the spinal ganglion. The development of afferent fibers in the autonomic system is disputed by some. Langley and Koelliker, especially the latter, are in doubt as to whether there are true afferent paths in the autonomic as such, claiming that the sensory elements are the same or rather run the same course as the somatic afferent nerves, namely, to the spinal root ganglion. These most certainly spring from the posterior root ganglion in their embryonal development, and make their way to the viscera from this origin. So that the law of Bell holds good for the autonomic system also, namely, that the visceromotor nerves leave the spinal-cord by the anterior roots, while the viscerosensory leave by the posterior. The further development of the autonomic cells in the cord, in the course of which they become separated into groups with many layers of somatic cells intervening between these groups, is perhaps conditioned by a response on the part of the cell to special demands upon it. So that the groups of cells in the sacral division have a special function distinct from those of the thoracic or the bulbar.

As for the histological characteristics of the ganglia cells, they may be concisely described in the manner of Cajal. He distinguishes three types, depending upon the forms assumed by the dendrites: (1) cells with dendrites reaching far in all directions, (2) those whose dendrites remain within the pericellular capsule, ending in curves and hooks, and (3) those whose dendrites de-

velop most profusely on one side of the cell with many branches, meeting similar branches of other cells, forming thereby a web which he termed a "glomerulus." L. R. Müller believes that these groups are really one type whose dendrites became specialized by the needs of the particular organ to which they are accredited. We now come to the cells of the autonomic type found in the spinal cord.

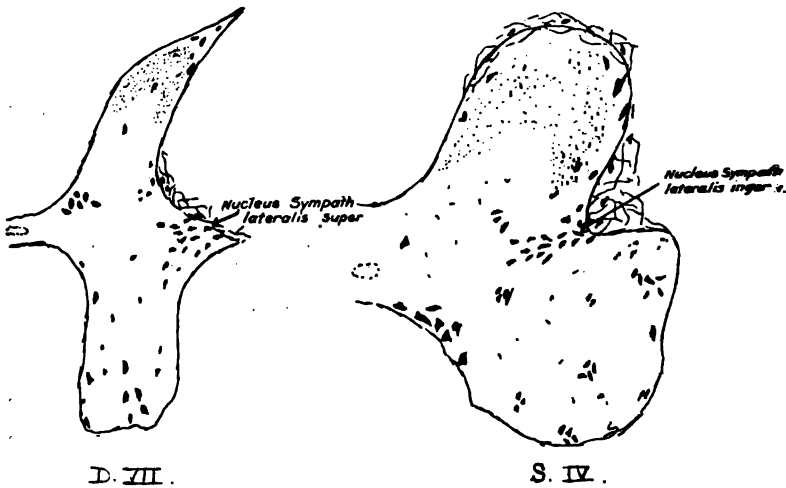


CHART No. 2. The sympathetic nuclei at the D. VII and S. IV levels of the spinal cord.

Stilling and Clarke have described various cell groups in the lateral region of the gray crescent of the cord as "Lateral Horn Group" and "Intermedio-lateral" tract respectively. Through the investigations of Gaskell, Sherrington, Langley, and Herring, these cells have been shown to have intimate connection with the gangliated cord of the sympathetic, *i. e.*, the thoracic autonomic, and Jacobsohn, in his recent work on the cells of the human spinal cord, names these groups directly as the "nuclei sympathici." He distinguishes two groups, one as occurring between the levels of the 8th cervical and 2d lumbar segments, which he calls "Nucleus sympathicus lateralis superior" and from which all rami communicantes of the gangliated cord arise, and a "Nucleus sympathicus lateralis inferior" which is found at the level of the 2d sacral segment to the end of the cord. This latter nucleus is the origin of the sacral autonomic system from which

the pelvic nerve arises. Marinesco, Onuf and Collins, and others have described the disappearance of these cells in the superior nucleus after resection of the gangliated cord, and after injury to the cervical sympathetic. While others have failed to corroborate these findings, yet there can be no reasonable doubt that the cells to be seen in the region which has been called the lateral horn of the gray matter of the cord differ markedly from both those of the posterior horn and even more so from the large cells of Clarke's column or those of the motor regions of the anterior horn. They are small, comma-like, resembling spermatozoa, and are easily distinguished from the others mentioned. They are most easily distinguished in the lower sacral regions where only a few of the large motor ganglion cells still persist and the sympathetic cells appear in large numbers in contrast. They are arranged in serried ranks, bipolar and parallel. In the visceral vagus nucleus in the floor of the fourth ventricle, similar cells are seen, which have been called by Edinger, "sympathischer vagus kern." The nerve endings of these first neurons, or as Langley calls them on account of their preceding the ganglia in the order of the efferent impulse, the "preganglionic fibers," are all similar to one another in that they terminate about the multipolar cell of the second neuron in a brush, or a forked manner. Lenhossek described the ends of the oculo-motor nerve in the ciliary ganglion as forked, and Carpenter describes the ciliary ganglia of birds in much the same way. L. R. Müller showed the terminations of the splanchnics in the solar ganglia to be net-like and arborescent.

Before taking up the physiological characteristics of the autonomic system, let us review briefly the terminology which seems most logical to us in the maze of terms which have heretofore been applied to various parts of the system, and as a result of which almost hopeless confusion has arisen in the interpretation of the different experiments conducted by many investigators. Langley deserves our thanks for having brought some order out of this chaos. There are two great gangliated cords, one on either side of the vertebral column, consisting of a series of ganglia united by short intervening cords. These two gangliated cords extend from the base of the skull to the coccyx. Superiorly they connect with plexuses which enter the cranial cavity, while inferiorly they converge on the sacrum and terminate in a connecting loop on the coccyx. Each of the ganglia of one of these cords

corresponds to one segment of the spinal cord, except in the cervical region where instead of seven there are only three ganglia. But these three are slightly segmented, suggesting that they were originally single and isolated as are the others. From the sympathetic nuclei before described, in the spinal gray, the sympathetic fibers emerge to terminate in some ganglion in the system. The fiber that thus emerges is called a "preganglionic" fiber. After its termination in a ganglion, the path of the impulse is continued along one or many fibers whose origin is in the cell or cells of this ganglion that have been activated by the preganglionic fiber. The fiber that takes up the impulse from this ganglion cell and conveys it to the viscus or other tissue, is called a "postganglionic" fiber. The ganglia of the gangliated cord are termed "vertebral" ganglia, while those of the great plexuses more peripherally situated, are called "prevertebral" ganglia. The short cords uniting the spinal nerves with the ganglia and fibers of the autonomic are termed "rami communicantes." The white ramus communicans is composed largely of fine medullated fibers passing from the spinal nerves to the gangliated cord. The "gray ramus communicans" is composed for the most part of pale, non-medullated fibers passing from the gangliated cord to all the spinal nerves. The white rami are, on the other hand, not furnished by all the spinal nerves, but solely by those from the first thoracic to the second lumbar. The visceral branches of the sacral nerves correspond to white rami communicantes, but they do not join the ganglia of the sympathetic cord, passing directly to the prevertebral plexuses. Similarly, the visceral branches of the vagus, glosso-pharyngeal, facial and the short branches to the ciliary ganglion from the oculomotor, pass directly to the peripheral ganglia.

Let us now, after adopting the classification and terminology which has just been presented, and for which we are indebted chiefly to Langley, take up the discussion of the physiological attributes of the various parts of this autonomic mechanism. The results which have been obtained by different observers are not always in agreement; in fact, occasionally they are in diametric opposition to one another. As a result, and added to a confusion of terms besides, the entire mass of experimental knowledge is fragmentary; there is no harmonious interrelation and correlation of successive experiments; the selective action of some drugs is

not universal on the nervous tissues even in the same species of animal, older animals responding differently from younger ones; and in the same individual indeed, the same irritant has different effects at different times. So that it is difficult, very difficult, to reproduce the same conditions in successive experiments. Furthermore, it is my opinion that the crude methods of dividing nerves, and stimulating either end with an induction coil, and then tabulating the results as similar to the effects produced in the normal functioning mechanism, should be discarded for milder, longer-working and self-produced currents, by means of various devices through which the natural flow of impulses can be modified in certain nerves, for long periods of time. Thus, I have succeeded in obtaining positive results by ligating nerves, but only tightly enough to cause a pressure neuritis and not complete severance, and allowing the animals to live for months thereafter before attempting to discover changes. However, the results which have the support of most physiologists and with which there seems to be a general agreement, I shall endeavor to place before you in as logical a way as may be possible for me, and I beg your indulgence if much of what is presented may seem old and trite to you.

Of the different divisions of the autonomic system, the cranio-bulbar and the sacral are similar in that they are local in their supply. That is, each has its territory of control distinct from the other. The sympathetic, that is, the thoracic autonomic, has also its local distribution, but in addition, sends fibers to the same structures as the other two. So that the tissues supplied by the cranio-bulbar and sacral autonomic have a double innervation, whereas some of those controlled by the sympathetic have only the one. Where there is this double supply, the two kinds of nerves are not necessarily opposed; but if their effect is different, then all the central nerve strands of one system have one effect, and those of the other system have one and the opposite effect.

As an example of the autonomic structures that have a double nerve supply, we may mention the muscular coats of the whole gut, salivary glands, gastric glands, heart, blood vessels and smooth muscle of the external generative organs, etc., while those of but a single supply, namely, from the sympathetic, are the blood vessels, glands, and smooth muscle of the skin, blood vessels of the entire gut, the spleen, and the internal generative

organs. And as examples of the antagonistic action of the two systems of innervation, we may give the external generative organs. Thus three or four spinal nerves send fibers via the sympathetic system to the external genitals, and each nerve when stimulated produces contraction; while several nerves send fibers by the sacral autonomic—the pelvic nerve or *Nervus erigens*—to the same structures whose stimulation causes relaxation. As examples of double innervation with apparently the same stimulation effect, we have the salivary glands, in which active secretion takes place with a stimulation of either system, and the bladder, in which contraction takes place under like conditions. But while the antagonistic action between the different parts of the autonomic system would lead one to presuppose a different origin and development of these different parts, with an independent history, yet they do have some common features. We will take up these resemblances.

1. No efferent fiber of the autonomic system runs from the central nervous system to muscle or gland without the interposition of a nerve cell in its course; therefore, these fibers which leave the central nervous system are all preganglionic fibers. This law of the system Langley proved as follows: 20 milligrams of nicotine were injected into a rabbit. Then the spinal cord was stimulated at various levels. There was no effect in the blood pressure, nor was there any increase of secretion in any of the glands. But when the stimulation took place peripherally to the ganglia, every autonomic effect was produced. Right here it may be pertinent to add that the effect of nicotine is quite variable in different animals and in different individuals of the same species. In some dogs it was impossible for Langley to obtain any paralyzing effect on the ganglia whatever. This idiosyncrasy in the action of nicotine accounts for the varying results in the hands of many experimenters. In the experiment described, as the poison is known to paralyze the ganglion cells and not the end organs, we see that every autonomic fiber must have had at least one such cell in its course from the spinal cord to the periphery—a proof of the law that the fibers that leave the spinal cord in the autonomic system are all preganglionic.

2. Most, and probably all nerve fibers which run from the central nervous system to a ganglion, *i. e.*, preganglionic fibers, divide into two or more fibers.

3. Each branch of a preganglionic nerve fiber is connected with a nerve cell.

4. The axon given off by such a nerve cell, *i. e.*, the postganglionic nerve fiber, never runs to another nerve cell of the system, but to peripheral tissue, branching as it goes so that it supplies a number of tissue cells.

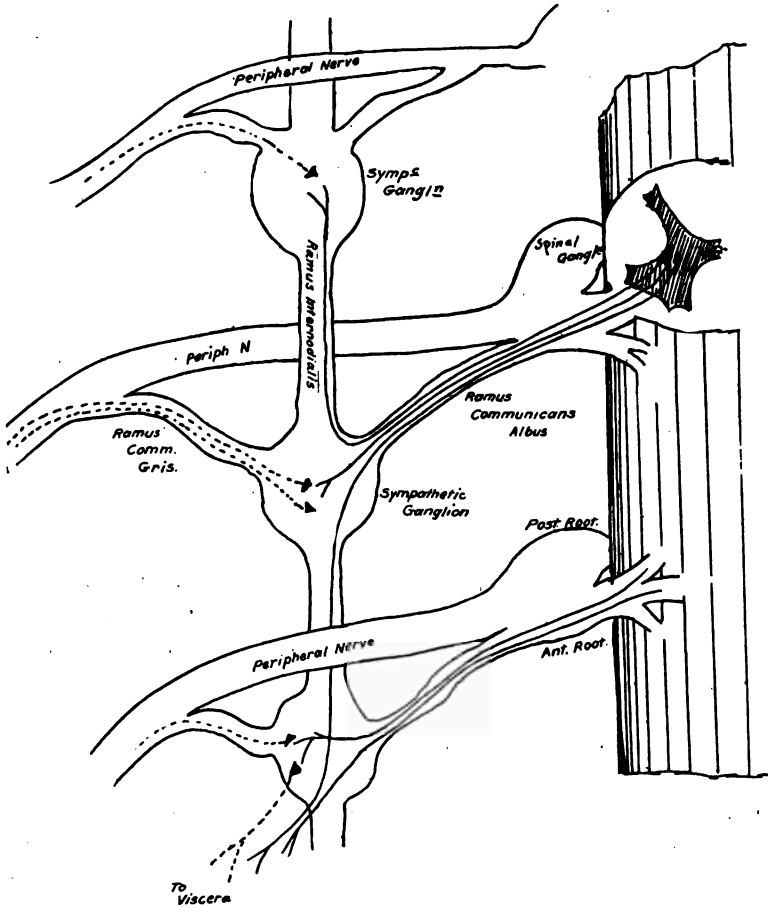


CHART No. 3. The efferent thoracic autonomic (sympathetic) system (Edinger.) The relation of the gangliated cord with the peripheral nerves, and with the spinal cord sympathetic nuclei.

5. All the nerve cells of the ganglia are on the efferent fiber. The afferent fibres have their trophic center in the spinal ganglia of the cerebro-spinal system. This will be shown later.

The fact that the preganglionic fiber connects with a number of cells in the ganglion, each of which gives off an axon, accounts for the fact that more fibers leave a ganglion than enter it.

Essentially, the ganglia of each system are for the supply of definite areas, and each ganglion supplies *all kinds* of fibers for that area by its system. The sympathetic ganglia are vertebral or prevertebral, but these correspond imperfectly to their distribution. Thus the solar ganglion and the inferior mesenteric are visceral ganglia, while the ganglia of the lateral chain from D₄ down are for the body wall. The stellate and cervical ganglia are partly for the wall and partly for the viscera. The sympathetic nerves are intimately connected with the arteries, but those for the skin leave the arteries for the somatic nerves. The skin areas for the successive gray rami and the lateral ganglia correspond largely to those of the spinal nerves which they join. The sympathetic fibers in the body wall overlap one another by about 1 mm. Each ganglion of the lateral cord sends the majority of its fibers to a somatic nerve: some send a few to the nerve above or the one below, or to both. The sympathetic runs to all parts of the body, yet it does not have equal control of all parts. The gray rami, for instance, cause great contraction in the blood vessels of the skin, but little, if any, in the small vessels of the skeletal muscles.

Preganglionic Axon Reflexes.—As there is in the whole autonomic system no commissural fiber connecting cell with cell, there can be no true reflex in this system as such. But Langley endeavors to explain certain apparently reflex phenomena by a theory of preganglionic and postganglionic axon reflexes, somewhat as follows.

As the peripheral neurons connected with a spinal neuron are not all in one ganglion, except for the superior cervical sympathetic, a nervous impulse set up in one branch of the preganglionic fiber passes to the other branches and so to the peripheral ganglia and to tissues more remote from the point stimulated. In no case is a reflex set up by an afferent nerve or neuron acting on an efferent one. His theory of the *postganglionic axon reflexes* is that there is a spreading-out of an impulse from one branch of a peripheral neuron to its other branches. Any strong local irritation or contraction brings them into play. It is however by no means universally accepted that these theories are correct explana-

tions of the difficulties. One great objection to the theories is that an afferent impulse becomes converted into an efferent one without the interposition of a cell body and further, that a single neuron can at one time act afferently and again efferently. As examples of these reflexes, we may cite the phenomenon of the section of gut, removed from the body, into which a small rubber ball was introduced, being brought into peristaltic activity by this foreign body. If the Auerbach plexus of the gut is first removed, however, the peristalsis does not occur. This was shown by Magnus. The heart continues to beat even though all of its nerves are sectioned. Exner has shown that if the mucosa of the

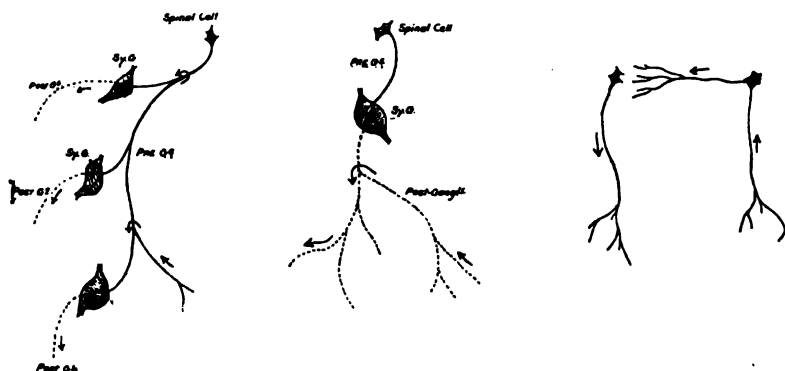


CHART No. 4. Illustrating the preganglionic and postganglionic axon reflexes and the difference between them and the common commissural reflex. The dotted lines represent postganglionic fibres, and the continuous lines preganglionic fibres. The arrows indicate the reflex paths.

gut is irritated by a sharp pointed instrument, a contraction of the submucous muscular coat is the result. Apart from these purely autonomic reflexes, we have others which for want of a better name might be called mixed reflexes, in which the afferent impulse is conveyed by somatic nerves; and then in the spinal cord or in the brain as the case might be, is transferred to the cells of the autonomic system of which we have already spoken, to be transmitted to the tissues governed by them. Warming of the skin reacts upon the vasomotor centers and those of the sweat glands in the cord, and produces through them, via the white rami communicantes and the gangliated cord, the gray rami and the peripheral nerves, a dilatation of the superficial vessels and a production of sweat. Again, irritation of the glans penis is con-

veyed as an afferent disturbance to the autonomic centers in the sacral cells of the spinal cord; thence efferently, an erection of the organ is produced. If the irritation continues, then the afferent impulse is sufficiently augmented to overflow to the higher centers in the upper lumbar segments of the cord, whence via the prostatic plexus and the plexus vesicæ seminalis, the impulse is converted into, or rather determines, ejaculation.

In the autonomic system, as well as in the cerebro-spinal, there is a blocking of the impulse backward, so that such an impulse cannot return through the autonomic motor nerve cell to other cells of the same ganglion.

A subsidiary system to the autonomic is that occurring in the walls of the gastro-intestinal tract, which Langley calls the "enteric" nervous system. This consists of the plexuses of Meissner and Auerbach. The Auerbach plexus is the series of cells and ganglia to be found superficially placed, that of Meissner usually in the submucosa, of the entire gastrointestinal tract from the beginning of the unstriped muscle of the esophagus to the end of the rectum. We do not know as yet the character of their connections to the autonomic and their control over the gut, except that they seem to have the power of independent action from the central nervous system. Analogous to them are the plexuses in the walls of the bladder, the uterus and other organs.

Before we leave the subject of the efferent fibers of the autonomic system, one objection to the law of Bell and Magendie that all efferent nerves pass out from the spinal cord in the anterior roots, must be cited. It is based on the experiments of Stricker in which he is supported by many other observers, and consists of the fact that stimulation of the posterior roots of the sixth and seventh lumbar nerves of the dog, after their section from the cord, invariably caused a flushing of the hind foot of the animal and a rise of temperature in the member. Langley opposes several arguments to the validity of the experiments. The result, declared Stricker, proved that vaso-dilator nerves emerged from the cord by means of the posterior roots. Langley, however, states that all the experiments made by Stricker and his followers were made upon young animals in whom it was probable that some of the current spilled over into the white ramus close to the posterior root. In the coarser structures of older animals, this was hardly possible. And it is a fact that many of the experimenters

declared that the work was more satisfactory when carried out on young animals. Later, Bayliss showed that the effect was produced by "antidromic" action on afferent nerves. The same result may be obtained by stimulating the afferent fibers of the twelfth and thirteenth dorsal afferent nerves, producing a vasodilation of the blood vessels of the intestines. By antidromic action, Bayliss means a conduction of the impulse in a contrary direction to the normal one. That is, the current flows efferently through an afferent nerve. The explanation does not seem all-sufficient.

We now come to a part of the subject which has given rise to difficulty, misunderstanding, and certainly is characterized by some obscurity. That is, the *afferent fibers* of the autonomic system. L. R. Müller has stated that Langley and Kölliker have both denied the existence of afferent fibers in the autonomic. What Langley did say, was simply that the sympathetic, *i. e.*, thoracic autonomic sent no afferent fibers to the body wall or limbs or head (where it overlaps the bulbar autonomic), and only a few to the region where it overlaps the sacral autonomic: but that it did send them to the thoracic viscera, stomach, intestines, liver, pancreas and kidney. The bulbar and sacral autonomic nerve trunks send afferent nerves to all organs to which they send efferent fibers. These fibers transmit pain, although the vagus perhaps does not. The splanchnics are all markedly sensory. The afferent and efferent nerves of the sympathetic run in the same trunks. Afferent fibers, as a rule, run in the *white rami*, a very few being in the gray rami—for there is no effect when the central end of a gray ramus is stimulated. The cell bodies of the afferent nerves are probably all in the spinal root ganglion for, when just peripherally to the posterior root ganglion, the nerve is cut, all medullated nerve fibers in the white rami degenerate; and after section of the splanchnics, no degenerated fibers are seen in the white rami: therefore, there are no cells for the afferent fibers in the peripheral ganglia. The sacral autonomic fibers give the same results. Practically all the afferent fibers are medullated. The non-medullated fibers in the white rami are simply small gray rami attached to the white ones; and the large gray rami give no effect when their central ends, after section, are stimulated. If the trophic center of the afferent fibers is the same whether from the viscera or from the other tissues, we

would imagine the effects from their functional activity to be the same. But this is not so. The differences may be stated to be as follows:

1. The viscera give little or no pain when cut; but strong contractions within their walls may give rise to great pain:
2. The localization of pain in the viscera is very imperfect:
3. In pathological conditions, the viscera give pain in the body wall, that is, pain apparently arising in the body wall, to which Head has given the name, "referred pain."

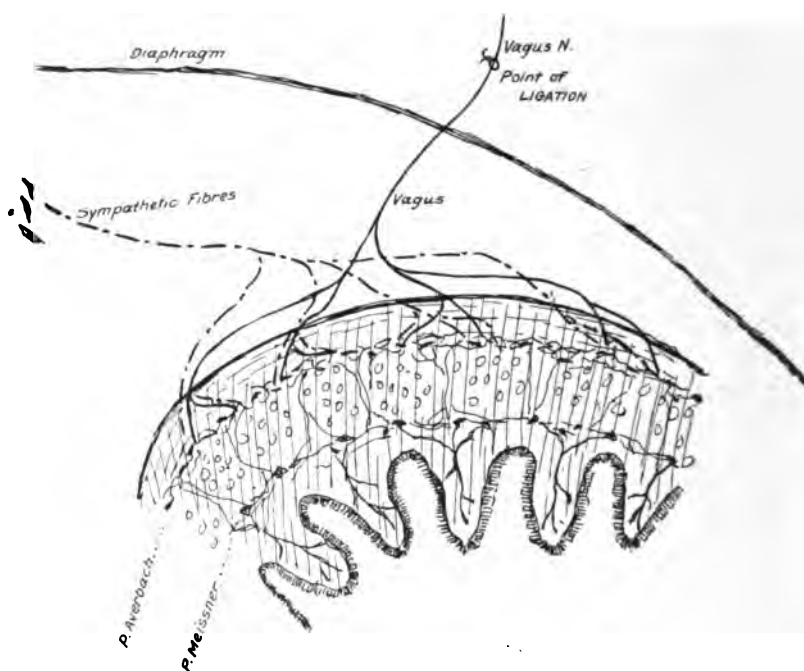


CHART No. 5. The double innervation of the stomach by the sympathetic and autonomic systems, showing the position of the plexuses of Auerbach and of Meissner.

The reason assigned for the lack of pain is that the threshold for pain is higher from the viscera, or that there are fewer fibers to the viscera than to the skin, which is a fact, or again, that there is an extra cell in the afferent path via the spinal ganglion.

Langley says that the best method of distinguishing afferent autonomic fibers from somatic ones, is to regard all those as affer-

ent autonomic which give rise to reflexes in the autonomic tissues and which are incapable of directly giving rise to sensation—all others are somatic. Therefore,

1. Afferent fibers in the vagus, the pelvic nerve, and all white rami are partly somatic, for they all can give rise to pain:

2. Afferent autonomic fibers are present in all spinal and most cranial nerves:

3. All posterior root ganglia contain autonomic as well as somatic nerve cells.

The only distinguishing anatomical feature between afferent fibers of the autonomic and somatic types is that in the former kind there is no central connection with the cortex for pain.

While, as we have seen, no evident connection exists between the autonomic cells as such, and the cells of the cortex, yet it would be useless to deny that an enormous influence is exerted upon the autonomic system by *cerebral* activity. While Bechterew and others have gone as far as to state that there are certain areas of the cortex which control the vegetative activities, especially those of erection, of the production of sweat, and of intestinal peristalsis, yet proof of this is still wanting. L. R. Müller is of the opinion that even the will is powerless to influence the functioning of the autonomic system. In opposition, Lewandowsky cites the fact of voluntary emission of urine. Yet as a matter of fact, how often do we see patients who cannot void urine even though they will? Some time ago there came to the Charité in Berlin a man who could voluntarily dilate his pupils, who could cause the pilo-motor muscles of his arms to raise the hair of the arms, and who could at will produce the phenomenon of goose-flesh in various parts of his body. He was presented as a case of "voluntary autonomic control," a manifest contradiction in terms. When closely questioned, he admitted that his effects were produced not immediately by his will, but always by the intermediation of some association called into being by him. Thus, when dilating his pupils, he always imagined himself looking far into space, under which conditions the pupil does dilate. For the goose-flesh effect, he would picture to himself his arm plunged into ice-cold water, and the goose-flesh appeared. We all know that various associations produce autonomic effects without our will, and it is reasonable to infer that if we can recall these associations through our will, the same autonomic effects

will be produced. Joy causes a rapid heart's action; shame is accompanied by blushing; fear sends the blood from the face and lips, and dries the mouth; psychical irritation may cause vomiting, or asthma, or diarrhea; and sexual excitement is followed by erection. Any of these effects can be reproduced by calling up the associations which accompanied their presence at some previous time. So that only indirectly can the will control the autonomic mechanism, a far different matter from the voluntary absolutism over the cerebro-spinal. This is of far reaching importance, for, as our moods depend upon the varying adjustments of ourself to our environment, and as our moods are made up of such components as were just mentioned—joy, fear, anger, shame—we see that the harmony of the activities of the internal organs depends partly upon our proper adjustment to our surroundings. And our will, as such, can help us not at all to overcome our difficulties in the internal economy, but only in so far as it can make our voluntary activities harmonize with their environment. As has been said before, the manner in which these moods and associations act upon the autonomic cells in the cord is absolutely unknown: whether in the deeper parts of the brain structure the organs have their centers and thence by heretofore unrecognized paths these centers activate the cells is mere surmise. It is true that in the hypothalamic region a point has been found by Karplus and Kreidl which when irritated produces dilatation of the pupil; Aschner found that the floor of the third ventricle contains an area which partially controls the sugar tolerance and Lichtenstein produced bladder contraction by stimulating a part of the hypothalamus; but these results are quite isolated and want further proof.

It has long been known that in unilateral affections of the medulla and of the cervical cord the palpebral fissure and the pupil of the affected side become narrower than the contralateral one. This same result has been obtained experimentally by sectioning the cervical cord antero-posteriorly and removing one lateral half. If however the cervical sympathetic is first resected, and the superior cervical ganglion is extirpated, no such difference is obtained. Again, when one hemisphere of the cerebrum is removed, a slight narrowing of the pupil of the same side is seen, but not in the same degree as in the former case. When the entire cerebrum is removed, there is no difference in the pupils, but

a following lateral half-removal of the cord at the 1st cervical level again gives the pupillary difference (Trendelenburg and Bumke). Thus we see that each side of both cerebrum and mid-brain sends impulses to the same side of the cervical sympathetic to influence the tone of the pupil. These facts are the sum of our knowledge of cerebral centers for autonomic activity, and of our knowledge of spinal cord tracts for the carrying of autonomic impulses. L. R. Müller believes that there is the possibility of the same changes in the excitability of the medulla and the cord occurring as with the changes in mood in the psychic centers, and that thus we can understand in a measure the production of effects in the viscera through a disturbance of their spinal centers. The opposite, or rather the converse of this proposition, the manner in which certain disturbances in the viscera can give rise to pain, appreciated in the sensorium, but referred to certain skin areas widely known as "Head" zones and not to the viscus in question, is simply explained by various investigators as due to "irradiations" taking place in the posterior root from the afferent autonomic fibers conveying the painful impulse, to the cerebro-spinal nerves in juxtaposition to them, and thence carried to the cortex. A new theory of the nodes of Ranvier, advanced by me a year ago, in which these nodes serve as channels of communication between close-lying medullated fibers, will serve to explain these "irradiations," as actual currents between highly charged fibers and those less markedly so. I need not exemplify these "Head" zones for they are undoubtedly well known to you. In the same category do we find the cases of herpes zoster in various skin areas due to visceral disease.

As far as the *pathology* of the autonomic system is concerned, comparatively little has been written. Here we have the large mass of clinical material which has been but sparingly studied until this last decade, and which seems to provide problems which have only been touched upon. Thus, tachycardia, bronchial asthma, hyperacidity, gastric ulcer, gastric crises, vasomotor neuroses, the internal secretions, status lymphaticus, glycosuria, to say nothing of some of the hyperplastic conditions such as giant colon, face us for solution. One of the reasons for this paucity of results I believe is the fact that when through some abnormality, a tumor, or caries, or other destruction of tissue involving the autonomic system, we might be confronted with some well-

defined symptom-complex, the inherent automaticity of the ganglia connected with the different viscera compensates for this loss of control in large measure, and we lose the view of the mechanism by the restoration of apparently normal activity. Even in transverse cord lesions the only serious autonomic effects observed are the loss of bladder and rectal reflexes. One classical experiment made upon the cervical sympathetic as long ago as 1852 by Waller gives a basis for pathological changes observed in some lesions. It was that after section of the cervical sympathetic, the part in connection with the superior cervical ganglion showed the microscopical changes of degeneration: but that the portion still attached to the spinal cord as well as the part beyond the ganglion remained normal. Also that stimulation of the part attached to the ganglion caused no change in the pupil while stimulation of the ganglion itself did cause the dilatation. It was as a result of this work, since confirmed by many, that Langley made his great division into preganglionic and postganglionic fibers, representing the part of the path still attached to the cord, and that leading from the ganglion respectively.

It might be well at this place to describe two experimental results obtained by Langley in the investigation of the regeneration of autonomic fibers after section. He found readily enough that preganglionic fibers reform connections with their ganglion cells after section. Indeed, the various fibers of a common trunk seem to be able to refind their cut off portions in the separated part, each for itself, and each individual fiber after regeneration of the entire trunk, when stimulated, gives the same results in the same areas of the periphery as before section. This power of the individual fiber to find its own cell in the regenerative process, is assumed by Langley to be of chemiotactic nature. But more interesting, even, than this observation, is that made by the same investigator in the matter of the possibility of the growth of preganglionic fibers of one type—the autonomic—into ganglia of the other type—the sympathetic. He divided the vagus in the neck and also the cervical sympathetic at the same place. The central end of the vagus was then joined to the peripheral end of the sympathetic. In about a month's time, the connection with the superior cervical ganglion was complete. Stimulation of the peripheral end of the nerve caused all the effects that were normally produced by stimulation of the sympathetic itself, dilatation

of the pupil, contraction of the vessels of the ear, etc. Still more striking is the result of the union of the central end of the lingual nerve with the peripheral end of the cervical sympathetic. The lingual contains vaso-dilator fibers, and the cervical sympathetic vaso-constrictors. When this hybrid nerve is stimulated, contraction of the arteries of the ear takes place. It is difficult to avoid the conclusion, says Langley, "that the fibers of the vagus and of the lingual must in the respective cases change their function." Personally, I believe that the nerve fibers have no inherent function in themselves, but that of conduction. It depends entirely upon the character of the end organ to which the nerve conducts, as to what effects are produced. If we have a rubber hose connected to a spray nozzle, we will still get the spray effect whether we use the original tube of rubber, or whether we cut off a part of the rubber and substitute some other kind of tubing, even though the new tubing had previously been used for throwing a full stream. In this light, there are no such differences between fibers as we have come to believe, such as vaso-constrictor and vaso-dilator. Their terminations characterize their effects. One other criticism I would like to advance in all the work that has been done on this autonomic system. That is, that the effects are largely those due to stimulation of fibers and ganglia, with resulting constriction or dilatation of arteries, pilo-motor effects, increase or diminution of secretion, depressor or accelerator or inhibitory results on the cardiac muscle, degeneration and regeneration of nerves after section, paralysis of ganglia or nerves by toxic agents, contraction of smooth muscle, activity of the sweat glands, and so on. But in all this, where is the observance of the basic principle of the functioning of the autonomic system, namely, that it is a system which conserves the normal continuity of life and of the vital functions?

In order to determine any abnormality in a system which normally controls and regulates the *continuity* of functions, it is necessary to observe the *continuous* activity and the results of such continuous activity in the mechanism; and not to remain satisfied with single results and immediate results of some one toxic inhibitory experiment, or of nerve section with succeeding stimulation of the cut ends, or of secretion following stimulation of certain nerve trunks, or flushing or pallor of different skin areas under similar conditions of stimulation. Such experiments will give us

a certain amount of information of the course and situation of nerves and their ganglia, and so are of service; but they do not give us a correct idea of the activity of the system. For they make use of means which rarely or never occur under usual conditions of life. No one nerve or ganglion of the sympathetic is ever under any circumstances brought into single activity naturally. Indeed, the entire mass of fibers and ganglia are an interacting, balancing, mutually compensating mechanism, and stimulation by bodily toxins and ferments calls forth the response of them all. To mention only one error in the inferences from such faulty experimentation, I will cite the following. The vagus nerve has been shown by many observers, Pawlow, Schiff, Van Yzeren, Cannon, among them, to cause, upon stimulation, increased motility of the stomach walls, and increased secretion of the stomach glands. Therefore, section of the nerve ought to show diminution of both these functions, and inferentially an atrophy of both muscle tissue and glands through disuse. Which is also partially true and confirmatory of the first experiment. One might infer from these conclusions that a partial inhibition of the vagus through pressure upon it by a new growth or gland, or diaphragmatic pinching, all of which can take place in life in our body, must cause a *partial* glandular and muscular atrophy of the stomach. But this is decidedly not so in any degree. Cats in which I have caused such a pressure neuritis on the vagus by tying a ligature about the nerve just before it descends through the diaphragm, and which I have allowed to live for some months after, all showed a marked increase of the number of glands in the stomach, and the muscular coat was thicker and firmer than in the controls. The answer to this is that the balancing sympathetic, deprived of its antagonist's full opposition, overacts its part, and such overaction shows itself in excessive vegetative activity. That is, the sympathetic to the stomach probably presides over the *continuity* of the growth of the mucous cells of that organ, and the vagus keeps this growth within bounds. Here we have an actual insight into the workings of the autonomic system. Had we in the experiment cut out both vagi entirely, as has been done many times, the sympathetic, having no antagonist left, is not brought to activity. As a result, the enteric subsidiary system, that of the plexuses of Auerbach and Meissner, would alone carry on the work of control, and carry it on for a time passably well;

but we would have learned little of the function of the sympathetic. The matter lies quite differently in the somatic system, where there is no assumption of control of continuity of function. In this system, isolated experiments and single tests on any nerve trunk with its end-organs are valid, and allow of deductions of universal application from single instances with almost mathematical legality.

We now come to that aspect of the autonomic system which is pharmacological in character, that is the behavior of the various parts of the system when placed under the influence of different drugs and poisons. It is a universally recognized law that in poisoning by some systemic agent, the nerve fiber itself is not affected, but only the nerve cell and the end-organ. So that in the autonomic system, we have three units that we influence by means of such a systemic poison. *First*, the cell in the spinal cord giving rise to the preganglionic fiber; *secondly*, the synapse in the autonomic ganglion, including both the ganglion cell and the termination of the preganglionic fiber; and *thirdly*, the end-apparatus in the viscus or other peripheral tissue. Let us take these units up separately, beginning with the most easily comprehensible.

First: Poisons acting on the synapse. Langley, following Schmiedeberg, showed that all synapses of the autonomic system are first irritated, then paralyzed by the action of nicotine, and similar poisons, so that finally the impulse to the postganglionic fiber is blocked. To this action, the effects of tobacco poisoning are credited, namely, bradycardia, tachycardia, vomiting, diarrhea, salivation, and so on.

Secondly: Poisons acting on the end-apparatus. Here the conditions are somewhat more complex. The end-organs of the sympathetic react differently from those of the autonomic, and what we have heretofore classed as belonging to the sympathetic, namely, the sweat glands, react to the same drugs as the autonomic end-organs. So that, pharmacologically, we must reconstruct our conception of the autonomic system obtained anatomically or physiologically. We then have for the poisons that act upon the autonomic ends, the following:

Autonomic ends	{	<p><i>react</i> to, with few exceptions, the cholin group, cholin. pilocarpine, physostigmine, muscarine;</p> <p><i>paralyzed</i> by, drugs of the atropine group.</p>
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Sympathetic ends { *react* to, and stimulated by, adrenalin group;
 paralyzed by, no known agent.

By these means can we differentiate between the various nerves functionally. Anatomically, we can tell superficially the origin of a particular nerve, whether cranio-bulbar, sacro-autonomic, or sympathetic, but where there is double innervation, our anatomy helps us but little, to decide which division the nerve belongs to. Thus the vagus, which is free seemingly from all anatomical sympathetic fibers, can be proven to possess such fibers which run to the bronchial and cardiac musculature, the stomach and the bloodvessels. Also, as before mentioned, the sweat glands are innervated by fibers which, though seemingly sympathetic, react to autonomic stimuli, and therefore such fibers must contain autonomic strands. In the same way, says H. H. Meyer, can the nerve supply of the uterus of the cat, which Langley states is purely sympathetic, be demonstrated to contain autonomic fibers.

The *irritation of the autonomic ends* shows itself in myosis, paralysis of accommodation, paralysis of peristalsis of stomach and gut, contraction of the uterus, bladder, ureter, of the bronchial musculature, a slow and weak heart action, paresis of the abdominal blood-vessels, pallor of the skin, and an increase of glandular secretion throughout the body. These effects are never all produced at one and the same time, nor are they always equally strong. And some of the irritants such as cholin and physostigmine do not seem to be direct irritants but simply act to make the autonomic ends more susceptible to the physiological stimuli of the body. The chief poison of this group is cholin, which is a constant component of all animal tissue, and of lecithin, and Lohmann is of the opinion that it is produced in the suprarenals and is thence furnished to all parts of the body. That is, it is a poison produced in the body, to which the body is accustomed, and under whose influence the body is constantly; it is a *hormone*. It is surmised that the normal sensitiveness of the autonomic nerves is preserved by its action, and that consequently, its absence in the system would severely inhibit their activity.

Another interesting fact in this connection is the symptom complex known as *anaphylactic shock*. Here we have bronchio- and visceromotoric spasm, cardiac inhibition, paresis of the abdominal vessels, diminution of body-temperature; a true auto-

nomic stimulation effect. Biedl and Kraus have shown that the similar picture is produced when split-up albuminoids are injected intravenously into the system. Both conditions, says Meyer, are alleviated by the autonomic depressant, atropin (shown by Auer and Lewis), and further, that it need not be a bacterial poisoning always that depresses the autonomic system, but that the ordinary partial reduction product of the proteids by bodily enzymes can cause the same results.

The condition of auto-intoxication, produced in obstipation, and the various intestinal bacterial diseases can thus be better understood as releasing these autonomic poisons. Their mode of entrance into the body is through the liver and the intestinal walls.

The *paralysis of the autonomic* through atropin, scopolamin and their group of poisons, can best be explained by citing an example of their action. In chronic obstipation or intestinal paralysis through lead poisoning, atropin relieves the spastic closure which has been brought about by irritation through the lead of the vagus nerve-ends in the intestine, by its paralyzing action on these vagus nerve-ends. Bayliss and Starling have shown that the atropinized bowel, which does not act any longer to an autonomic irritant such as pilocarpine, can still be stimulated by electricity applied to the vagus stump. Therefore there must be two paths from the vagus to the bowel, of which only one is paralyzed by atropin. The other one is probably that to the plexus of Auerbach which we believe controls the rhythmic action of the muscular wall of the gut. Magnus states that this plexus is not poisoned by pilocarpine nor by atropin, but is slightly stimulated by the latter. It is hence easy to understand how atropin relieves the spasm of the bowel and by stimulating peristalsis at the same time, overcomes, by this twofold action, the spasmodic closure. In the other hollow organs, uterus, bladder, ureter, we have similar conditions, and atropin relieves spasm of their walls in the same way, and does not inhibit the autonomic control of their walls as it does in the bronchi and the heart, and the arteries, and the pupils. Witness the effect of atropin in nephrolithiasis, in diminishing spasm of the ureter and in assisting the passage of the stone to the bladder.

We shall now take up the action of poisons upon the *sympathetic end-organs*. These are irritated or stimulated throughout the body, with the exceptions of the sweat glands, by *adrenalin*.

The resulting effect, says Meyer, is the same as that obtained by stimulating directly the nerve to the particular organ under observation whether that effect was inhibitory or acceleratory. Adrenalin by intravenous injection has little effect upon bronchial tubes that are normal. But when the bronchi are spasmodically contracted, it paralyzes their muscular coats and relieves the spasm. This by way of showing that it is easier to bring abnormal back to normal than vice versa. This law is seen in the entire autonomic system in balancing organs. In the one case we work with the inherent nature of every cell to compensation and regulation, the tendency to self repair; while in the other we work against it. The gravid uterus, says Cushny, responds to stimuli to produce contraction of its walls, when the virginal organ does not react at all, or even in an opposite way, to the same drug. Another characteristic of the action of adrenalin upon the sympathetic is seen in the condition of sympathogenous hyperglycemia, and glycosuria. This can be brought about by the artificial addition of adrenalin to the blood, and also by increased adrenalin secretion from the suprarenals. This latter may be occasioned by stimulating the sympathetic nerves to the suprarenal glands. That the sympathetics do bring this about, Dryer, Asher, Elliot, Dale, and Laidlaw have conclusively shown, for, after section of the splanchnics, or after removal of the suprarenals, the stimulation of the glycosuric center in the medulla is without result. In a like manner, can be explained the production of a diabetes through the effects of carbon monoxid, diuretin, cocain, asphyxia, nerve-shock, and psychical disturbances such as fear, fright, mania, pain reflexes; all of which produce through the center for the suprarenals and the sympathetics, the irritation of the suprarenals themselves, and a consequent adrenalemia, glycemia, diabetes, mydriasis, increased blood-pressure, tachycardia, and inhibition of peristalsis. We now have before us a very interesting paradox. If the artificial introduction of adrenalin to the blood stimulates the sympathetic, and thereby also the adrenals, we ought to get from them a further supply of adrenalin; and this in turn should bring about a further sympathetic stimulation, with again a fresh supply of adrenalin and this ad infinitum, or at least until exhaustion of the sympathetic takes place. But as we see nothing of the kind, we must conclude that the suprarenals are themselves immune to adrenalin. Other agents resemble adrenalin in their effect upon

the sympathetic ends. Thus, the secretion of the hypophysis, pituitrin, ephedrin, caffeine, and chiefly cocain may be mentioned. Of these, ephedrin acts upon the pupil as a dilator, caffeine upon the cardiac accelerator, and cocain upon the small capillaries, as a vasomotor contractor. Froehlich and Loewi have demonstrated that cocain, however, only sensitizes the end apparatus for the action of the ever-present adrenalin, and does not actually perform the work itself, leaving that to the adrenalin. They showed that the most minute quantities of cocain increased the effect of adrenalin upon the iris, the bladder, and the superficial blood-vessels. This, perhaps, throws some light on the fact of the hypersensitiveness of some individuals to cocain. This action of cocain is analogous to the condition present in exophthalmic goiter. Here, according to Froehlich and Gottlieb, we have an excessive secretion of thyroid origin, which, similarly to cocain, sensitizes the end apparatus of the sympathetic to the action of the normally present adrenalin to an abnormal extent. Iodine compounds call forth an increased thyroid secretion, and therefore secondarily cause similar results. Eppinger and Falta, among others, have shown that after extirpation of the thyroid, and thus diminishing the thyroid content in the blood, the animals experimented upon were markedly less sensitive to the adrenalin in the blood. Conversely, that an increase of thyroid substance in the blood caused a hypersensitiveness to the normal adrenalin content. (Falta, Kraus, Asher and Flack). In various animals different tissues were differently affected, in degree. Gottlieb showed that the accelerator end-organs in the rabbit's heart are more sensitive if thyroid extract is added to the preserving solution, and that in fact, animals that have been fed on thyroids for a while have a heart muscle that has a more rapid pulse-frequency after death, that is, have a higher irritability of the accelerators than normal ones. Finally, Loewi showed that the adrenalin sensitiveness of goiter patients is much increased, so that a few drops into their eyes produces mydriasis, which in normal persons is either not seen at all or only to a slight degree. *Pituitrin* is similar, especially in its glycosuric effects: but these effects are complicated, for it also stimulates the autonomic nerves, the nervus pelvici, at the same time as it affects the sympathetic controlling the cardiac and arterial musculature. These opposed effects, states Campbell, are due to the fact that pituitrin contains at least two different and physiologically antag-

onistic hormones. All the effects thus far cited of the sympathetic irritants were synergic effects, that is effects which mutually enhanced one another or at least supported one another. We now come to the antagonistic ones (aneirgistic).

If the pancreas is extirpated or degenerated, the iris shows an increased adrenalin affectiveness; the liver, which acts only through increased adrenalin content in the blood to overproduce sugar, now gives its sugar out spontaneously. Therefore, there is also probably a pancreatic hormone which inhibits the action of adrenalin. Falta believes that the production of this hormone is dependent upon the action of the autonomic nervous system, for he increased the inhibitory action of this pancreatic hormone to adrenalin, by stimulating the autonomic system with pilocarpine, and thereby diminished the diabetes. On the other hand, he increased the diabetes by depressing the autonomic system with atropin. Still another inhibitory action to these hormones is shown by calcium and its compounds. If calcium is abstracted from the tissues, the nerves become insensitive to stimuli, but if the calcium is only partially taken away, they become hyperexcitable. Of course, calcium is understood to be present in all tissues of the body apart from its presence in the bony structures, in considerable amounts and as a necessity of life. Chiaris and Froehlich have diminished this amount in their animal experimentation, by means of graduated doses of oxalic acid, which, combining with the calcium salts in the body as a calcium oxalate, calcium is in this combination excreted from the body. As a result of this deprivation of calcium, the sympathetic as well as the autonomic systems were put in a condition of hyperexcitability to their respective excitants, namely, adrenalin and pilocarpine, that is as regards their end-organs. And this effect does not seem to be limited to the autonomic system, but seems to be true for the cerebro-spinal as well. Here the motor nerves, through the deprivation of calcium, react excessively to electrical stimulation, especially to kathodal stimulation, a symptom characteristic of tetany and spasmophilia. These conditions are largely produced by insufficiency of the parathyroids. The investigations of MacCallum and Vögtlin, and of Erdheim, have shown that the assimilation of calcium in the body-cells is conditioned by the proper functioning of these parathyroids. Through their power thus to control the calcium situation, the parathyroids become important as con-

servers of the normal excitability of the nerves, especially those of the autonomic system. It might be well to state here that it is not so much the actual calcium content of the tissues that is important, as the relative content to that of the potassium and sodium ions. Relative increase of these latter is alone sufficient to cause hyperexcitability of the autonemics.

We now come to the *third* class of poisons or agents acting on the autonomic system, namely those which influence the *central apparatus*: In the centers now under discussion, we can likewise differentiate between those of autonomic and those of sympathetic character, but not nearly so sharply as was the case with the end-apparatus.

As autonomic central excitant,	{ <i>Picrotoxin</i> excites the vagus centers in the medulla, and coincidently those of the oculo-motor, chorda tympani, nervus pelvicus, those for sweat glands.
As autonomic central depressant,	{ <i>Botulismus-toxin</i> depresses the vagus, etc., as well as some cerebro-spinal motor centers.
Sympathetic central excitants,	{ Cocain, atropin, caffeine, and tetrahydronaphthylamin, all represent a group of central sympathetic stimulants.
Sympathetic central depressants,	{ Morphine, the chief representative of this group, chloral hydrate, and the antipyretics.

However, in neither system does there seem to be a sharp differentiation, by means of which the selective action of the agent can be determined to be entirely inclusive or exclusive. This is partly due to the fact of the action of the drugs upon other centers than those of the systems under observation, and partly to the mutual antagonism between the two divisions of the autonomic. So that, when the sympathetic centers are depressed by morphine, we get heightened tone in the autonemics, giving us myosis, bradycardia, sweat secretion; and with autonomic depression, mydriasis, tachycardia, due to increased sympathetic activity. The depressant action of morphine on the sympathetic system is found, however, chiefly in man and dogs, says Meyer; while in

horses, cats and cows, morphine causes sympathetic central excitement and stimulation. Stimulation of the sympathetic is usually combined with psychomotor cortical effects, and with irritation of the heat-regulating mechanism. So that anger, fear, joy, sexual stimulation, also, are accompanied by stimulation of the splanchnics, cardiac accelerators, pupillary dilators, and possibly of the heat center. Furthermore, as we have seen earlier in this paper, depression, worry, melancholia, cause the opposite conditions. These conditions can be brought about by the special poisons enumerated above: so that cocain, or atropin, both sympathetic central excitants, call forth psychomotor activity and an increase of the body temperature; whereas the sympathetic depressants, morphine, and the antipyretics cause psychic depression and diminution of the body temperature, with nausea and collapse. Complementary to these sympathetic effects, we get with autonomic central stimulation through picrotoxin, santonin, phenol and anilin, psychomotor inhibitory effects and temperature loss, although the same drugs produce at the same time convulsions. In all of these effects, we see the balance of the one system opposed to the other, an adjustment of equilibrium, the excitation of the one at the cost of the depression of the other. In a much modified form do we see in normal states similar changes to those produced by drugs, nuances in the tone of one or the other apparatus. Depending upon the relative accentuation of the respective systems, the predisposition of the individual, we recognize as a "sympathetic" make-up, one whose skin is dry and warm, who has rosy color, with large and mobile pupils, a rapid heart, a subjective feeling of warmth, a temperament which is passionate in all its moods. The autonomic type of make-up, on the contrary, is seen in individuals of quiet poise, with contracted sharp pupils, in deep-set eyes, a cool pale skin, slow pulse and cool blooded character. And the entire metabolic vital processes are dependent upon just such tonus shades as are here outlined, for have we not seen that the production and secretion of the vegetative hormones, the so-called internal secretions, control these vital processes, and that these hormones are produced in their turn in quantities proportionate to the active innervation of the respective parts of the autonomic system? So that in a broad way, our temperament and our bodily health are mutually dependent.

Now, although it would seem from the foregoing description,

that it is almost simplicity itself to recognize these various types of individuality, yet, practically, they do not always or even often present such complete and rounded out pictures. Eppinger and Hess have stated that for the most part, the so-called vagotonia is accompanied not with contracted pupil, but with wide pupil, but having bradycardia, hyperacidity and so on; why this should be so, is unknown. In Vienna, the theory of the action and reaction of the different vagus-system excitants and depressants, as well as those of the sympathetic system, is being applied clinically. Patients are experimentally examined by these drugs. Thus, either pilocarpin or physostigmine is administered and the results observed. If they result in hyperactivity of the vagus, that is, bradycardia, nausea and vomiting, excessive perspiration, spasmodic asthma, then the patient is recognized as a type of vagus instability, and is treated accordingly, that is, with atropin; after the administration of adrenalin, should the sympathetic symptoms be prominently or exaggeratedly present, then the type is recognized as one of sympathetic instability, in which case the condition is not so easily combated, for the drugs here given are to an extent less controllable. These would be morphine, chloral, the antipyretics, and perhaps the best of all, tobacco in some cases, depending upon the individual idiosyncrasy.

In conclusion, I might add only that from the mass of facts, which evidently have as yet not been assimilated, the future importance of the study of the autonomic system bids fair to assume proportions limited only by the number of ills that we are heir to.

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NORMAL LOOKING BRAINS IN PSYCHOPATHIC SUBJECTS

SECOND NOTE (WESTBOROUGH STATE HOSPITAL MATERIAL)¹

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Following is another fragment of a study bearing on the essential nature of the so-called functional psychoses. It has been thought best to publish this fragment by itself because it forms another (and presumably unbiassed) foil to the exactly similar study from the Worcester State Hospital,² 1913, in which were noted certain contrasts with material examined by one of the writers at the Danvers State Hospital and as yet largely unpublished.³

Before rehearsing those contrasts which occasioned the present study, it will be well to state briefly how we suppose the

¹ Being Contributions from the State Board of Insanity Number 32, 1914, 12. The first note on this topic was by E. E. Southard, entitled "A Series of Normal-looking Brains in Psychopathic Subjects" (from the Laboratory of the Worcester State Hospital) published as S. B. I. Contribution Number 14 (1913-14), being Article number 11 in a series offered in compliment to Dr. Hosea Mason Quinby, published in the *Am. Jour. Insanity*, 1913. (*Biographical Note*.—The previous contribution in this series was by E. E. Southard, entitled "On the Association of Hyperkinetic Symptoms with Partial Lesions of the Optic Thalamus," published in the *JOURNAL OF NERVOUS AND MENTAL DISEASE*, October, 1914.)

² Southard. A series of Normal-looking Brains in Psychopathic Subjects. Worcester State Hospital Series, 1912-13. *Am. Jour. Insanity*, Vol. 69, No. 4, April, 1913.

³ Southard. Medical Contributions of the State Board of Insanity of Massachusetts: Introductory Note. *Boston Med. and Surg. Jour.*, Vol. CLXIX, No. 15, pp. 537-540, October 9, 1913.

problem of the functional psychoses can be attacked by a study of brains.^{4, 5} Most studies of functional psychoses directly concern themselves with living concrete cases (if they do not merely content themselves with atmospheric or special theoretical statements); yet of these living concrete cases we are not always sure that post mortem examinations would not destroy their "functionality" by providing brain lesions which would either explain or hopelessly complicate the supposedly functional phenomena in question.

Accordingly we have turned the problem about and are seeking what can be learned of the history and various factors (including somatic lesions) in cases having normal brains. In the absence of conclusive proof that any autopsied human brain is ever normal, we lean on the hypothesis that every brain should be considered normal until proved abnormal. We further hold that a normal-looking brain is more likely to be really normal than an abnormal-looking brain. We hope therefore to catch some true examples of the functional psychoses by scrutinizing the list of the normal-looking brain cases. By eventual microscopic examination of suitable cases we shall be able to approach closer and closer to the desired aim.

The material of 500 protocols from the Westborough State Hospital, we owe to the courtesy of the pathologist, Dr. Solomon C. Fuller, who personally made almost every autopsy included in this random and representative collection.

The Danvers and Worcester results with which we have chosen to compare the Westborough results may be summarized as follows:

1. Danvers yielded approximately one normal-looking brain in four; Worcester one in three.
2. Danvers yielded a little more than three normal-looking brains in ten victims of dementia præcox;⁶ all of the Worcester series of dementia præcox cases (42 in number) yielded no gross lesions.

⁴ Southard. The Mind Twist and Brain Spot Hypotheses in Psychopathology and Neuropathology. Psychopathic Hospital Contributions 1914. 8. Psychological Bulletin, April, 1914, Vol. XI, No. 4.

⁵ Southard. Psychopathology and Neuropathology: the problems of Teaching and Research Contrasted. Am. Jour. Psychology, 23, April, 1912.

⁶ Southard. A study of the Dementia Præcox Group in the Light of Certain Cases Showing Anomalies or Sclerosis in Particular Brain Regions. Am. Jour. Insanity, Vol. 67, p. 1, July, 1910.

These differences, of much importance in assuming a point of view toward the functional psychoses, were attributed in the former study in part to differences in anatomical standards in the Danvers and Worcester laboratories. The pathologists in each institution were of a highly critical nature. But, as it happened, the Danvers pathologists were suspicious of a brain's normality, whereas the Worcester suspicions were perhaps levelled more at a brain proclaiming itself abnormal. We should be inclined to concede the better logic to the Worcester standards on our own principle that a brain should be considered normal until proved abnormal. But it is certainly well that both standards should be used for comparative purposes with large materials.

Moreover it seemed certain that the Worcester standards had leaned over backwards in permitting every one of 42 dementia præcox brains to be let go as of normal appearance. And there was also the surprising result in the Worcester analysis that there was actually a higher proportion of senile psychoses in the normal-looking moiety of the series (32 per cent.) than in the abnormal moiety (20 per cent.).

By way of comment upon the present analysis, it should be said that we have learned from Dr. Fuller that he may have had more of the Danvers bias⁷ than of the Worcester tendency, since it appears that his attention was early attracted to the numerous arteriosclerotic lesions of his cases and he accordingly dissected all brains with unusual detail—partly also to meet the formerly current view that the vast majority of brains in psychopathic subjects "show nothing" grossly. So that once more we may be viewing the effects of the *esprit de détail* rather than of the *esprit de l'ensemble*.

A word may be required to assure the reader that the abnormal-looking majority among psychopathic brains is not to be taken as proof positive that the causes of psychopathy have been discovered even for that majority. It is a far cry from the brain abnormality at autopsy backward to the clinical symptoms in life. We seek our normal-looking brains, not because the clinical correlations of abnormal brains are established, but because we wish to discover at last some functional cases which shall be above reproach.

⁷ Bias perhaps, but not training, since Dr. Fuller's point of view developed independently.

Westborough Normal-looking Brain cases classified by Diagnosis

Of 74 cases in which autopsy showed brains of a normal appearance (data of Dr. Solomon C. Fuller) drawn from a total series of 500 autopsied cases, there was (to judge by the assigned clinical diagnoses) a clinical grouping as follows:

Senile dementia.....	7
Secondary dementia	2
Organic dementia	2
General paresis	4
Total senile and organic psychoses	15
Manic depressive psychoses	9
Chronic melancholia	1
Involution melancholia	5
Total manic-depressive group.....	15
Dementia præcox	17
Paranoia	6
Total	23

Adhering to Kræpelinian lines, we find accordingly:

Endogenous deteriorations	23
Manic-depressive group (melancholia included).....	15
Senile and organic psychoses	15
Symptomatic psychoses	7
Epileptic psychoses	6
Alcoholic psychoses	4
Psychoses of unknown nature	4
Total	74

The following table shows the comparative numbers of normal-looking brains in the two series:

	Worcester	Westborough
Total brains	741	500
Abnormal-looking	492	427
Normal-looking	249	74
Per cent. normal-looking	34%	15%

The following table tests the standards as applied to dementia præcox:

	Worcester	Westborough
Total brains	741	500
Dementia præcox	42	35
Abnormal-looking	0	18
Normal-looking	32	17

The scant majority of abnormal-looking brains in the Westborough dementia præcox series is of course by no means so strik-

ing as the 68 per cent. found in the first Danvers series or the 92 per cent. found in a more recent Danvers series about to be published;⁸ but the figures are strikingly different from those at Worcester.

The results in the senile psychoses are instructive:

	Worcester	Westborough
Total brains	741	500
Senile psychoses	176 24%	109 22%
Abnormal-looking brains	96	102
Normal-looking brains	80	7

Thus, whereas about 45 per cent. of the Worcester seniles are recorded as having normal-looking brains, only about 6 per cent. of the Westborough seniles are so recorded. This disparity is perhaps due to the unusually careful dissections made by Dr. Fuller in all cases suspected of arteriosclerosis. The Westborough data give a much higher percentage of abnormalities than did certain selected series of Danvers cases. By consequence, some conclusions formerly drawn concerning the possible functionality of many senile cases must remain *suspect*.^{9, 10}

In connection with any study of functional psychoses, manic-depressive psychoses are of interest. A table shows comparisons:

	Worcester	Westborough
Total brains	741	500
Manic-depressive psychoses	36	34
Abnormal-looking brains	9	25
Normal-looking brains	27	9

Here is a disparity worth examining farther. Of course the standards of clinical diagnosis may vary. Then the tendency to arteriosclerosis on the part of manic-depressives may swell the percentage of abnormal-looking brains.

⁸ Southard. On the Topographical Distribution of Cortex Lesions and Anomalies in Dementia Præcox, with some Account of their Functional Significance (submitted to Am. Jour. Insanity, amplified from paper read at Washington (before Am. Neurol. Assn., 1913)).

⁹ Southard. The Margin of Error in the Diagnosis of Mental Disease: Based on a Clinical and Anatomical Review of 250 Cases Examined at the Danvers State Hospital, Massachusetts, 1904-8. Charles Whitney Page Series (1910. 2), Boston Med. and Surg. Jour., Vol. 63, No. 5, August, 1910.

¹⁰ Southard. Anatomical Findings in Senile Dementia: A Diagnostic Study Bearing Especially on the Group of Cerebral Atrophies. Am. Jour. Insanity, Vol. 66, No. 4, April, 1910.

Table of Durations

Duration	Cases
Under 3 months	12
3-12 months	12
1-2 years	5
2-3 years	9
3 years	4
4 years	3
5 years	7
6 years	3
7 years	2
8 years	1
9 years	1
10 years	3
11 years	2
12 years	1
13 years	1
15 years	1
16 years	3
17 years	2
19 years	1
55 years	1

{ 24 }
 { 29 }
 { 42 }
 { 13 }
 { 20 }
 { 31 }
 { 11 }

From the above table of duration it appears that 58 per cent. of the normal-looking brain cases were 3 years or less in duration of symptoms from onset to death, that 33 per cent. lasted but a year or less, and that 10 per cent. lasted less than 3 months from onset.

Following is a table of comparisons:

	Worcester	Westborough
Total normal-looking brains....	248	73
Duration 3 years or less.....	132 53%	42 58%
Duration 1 year or less.....	36 15%	24 33%
Duration 3 months or less.....	26 11%	12 16%

The Westborough series clearly contains a better representation of very acute cases.

Conclusions

1. The writers have tested former issues concerning the functionality of mental disease (derived from a comparison of Worcester autopsy material with that from Danvers) by a study of Westborough material in which neither a bias towards functionality nor a bias towards structurality ("organic nature") was likely.

2. The Worcester proportion of normal-looking brains in a series of psychopathic subjects was about one in three, the Danvers proportion about one in four; the Westborough proportion proves to be about one in seven.

3. The Westborough standards tend to overthrow the idea of the essential functionality of various senile cases, an idea that was suggested both by the Danvers and the Worcester series of autopsies.

4. As to the moot question of dementia præcox, the Westborough results stand nearer the Danvers results, exhibiting a scant majority of gross-lesion cases as against the long entirely negative series at Worcester and the high percentages of gross lesion found at Danvers.

5. In a previous study use was made of a principle that extensive microscopic changes may be wholly consistent with a grossly normal brain appearance up to a period not yet accurately established (say three months): in point of fact 11 per cent. of the Worcester series (26 cases) and 16 per cent. of the Westborough series (12 cases) had a total duration of symptoms of three months or less.

6. Practically it is often a year or more before visible and tangible changes in the brain of an undoubted character set in; and 15 per cent. of the Worcester series (36 cases) and 33 per cent. of the Westborough series (24 cases) had durations of a year or less.

7. Perhaps it is too much to ask the anatomist at the autopsy table to diagnosticate the results of finer diffuse destructive changes (non-globar, not affecting the projection system) which have lasted but a year or less.

8. Practically we look for recoveries up to three years more or less: 53 per cent. of the Worcester series (132 cases) and 58 per cent. of the Westborough series (42) had lasted but three years or less. Such cases may well show (and many of them have shown, though it is not our design to describe them) microscopic changes of an important reversible or non-destructive character.

9. Research should accordingly be bent upon those long-standing cases which nevertheless show no gross effects of their disease in the brain: The microscope may discover in this group either (a) evidences of reversible brain-cell changes such that they never produce any gross effects (physical or chemical changes not interfering with cell-nuclei or other vegetative mechanisms) or (b) no evidences of morbid brain changes whatever, but merely such appearances as are consistent with the brain's reacting normally to influences *ab extra*.

10. These orientation studies show how seldom are all the conditions right for testing such an hypothesis as that of the intrinsic normality of brain mechanisms whose reactions are taking effect in extrinsic abnormality, *i. e.*, the hypothesis that mental disease may be entirely functional so far as the brain is concerned.

11. Accordingly we seem still farther away from a strict proof that "the whole cortex, or even the whole nervous system, might be intrinsically normal but extrinsically abnormal in its reactions to a given chemical, physical, or other condition."

Society Proceedings

FORTIETH ANNUAL MEETING OF THE AMERICAN NEUROLOGICAL ASSOCIATION

HELD AT ALBANY, N. Y., MAY 7, 8, AND 9, 1914

The President, DR. HENRY HUN, in the Chair

(Continued from page 729)

SPINAL DECOMPRESSION IN MENINGO-MYELITIS

By A. S. Taylor, M.D., and J. W. Stephenson, M.D.

Except in syphilitic cases the usual outlook in non-fatal cases of meningo-myelitis is for a tedious illness, followed by slow cessation of active symptoms and the persistence of a greater or less degree of invalidism, according to the site and extent of the damage to the cord substance.

Of four cases in which spinal decompression was done, three made very prompt and nearly complete recovery, while the other one was uninfluenced.

In all four cases there was primary healing, no shock, and even in the unsuccessful case there was no evidence of aggravation of the symptoms.

Case histories in detail.

Decompression probably alters the circulation of the cord, improves its nutrition and so hastens the return of its functions.

Since properly executed, spinal exploration carries with it very little risk to the patient, the results obtained even in this small series of cases would seem to be an argument in favor of the earlier and more frequent employment of this procedure.

Dr. Pearce Bailey spoke very fully, particularly with reference to Dr. Taylor's last statement that laminectomy should be used more freely as a diagnostic measure. The first proof we have in published records of the result of laminectomy in skilled hands was the paper referred to by Dr. Taylor in 1909, in which Horsley recounted twenty-nine cases with only one death. In the cases of laminectomy performed at the Neurological Institute of New York during the past year there was only one death and that occurred in a case in which the tumor was very high and the patient was in a precarious condition from the start. We are in much the same position in delaying operation in doubtful spinal cases as we used to be in giving expectant treatment in acute appendicitis. We lose a great deal of valuable time, so that when finally operation is decided upon, the damage to the cord has become so extensive that the results of the operation are not very good. In view of the slight mortality from the operation itself, Dr. Bailey advocated laminectomy in all cases of focal disease of the spinal cord of chronic type which are not amenable to medical treatment. He thought

they should be operated upon for diagnostic purposes. The absence of pain does not contra-indicate the operation as pain is a sign of spinal cord tumors not to be relied upon. So that every case of subacute meningo-myelitis should be subjected to laminectomy.

Dr. Dercum said he recalled very vividly a patient whom he presented before the American Neurological Association at its meeting held in Philadelphia in 1890.¹ The case was one in which a spinal tumor was diagnosed but in which no tumor was found at the time of the operation. The dura, however, was found thickened and numerous adhesions were found between the dura and the pia mater. These were cut, the dura was freely opened, the adhesions freed as much as possible, the opening in the dura was not sutured and the man made a rapid and uneventful recovery. The paraplegia entirely disappeared. He had tried the same procedure a number of times since but never with the same happy result as in the first instance.

Dr. Ernest Sachs said Dr. Schwab and he had, in every case where myelitic symptoms were present and where they could not find the etiological factor as a matter of routine, resorted to exploration. They felt as Dr. Taylor, that exploration of the cord should be absolutely without any danger. In their own experience in a considerable number of laminectomies, they had only lost two cases in the past two years. As regards Dr. Taylor's question as to whether the incision of the cord, which was first suggested by Dr. Allen, is really the thing that counts, a case he had some two years ago may throw some light on it. Dr. Taylor is not quite certain whether it is the decompression or the incision of the cord which helps. This was a case of transverse myelitis in a negro who had been exposed to cold. The marked contractures the patient had, Dr. Sachs thought, might be helped by a posterior root operation. Exploration of the cord showed a thin cord, evidently atrophied. The cord was not incised, dura left open. Patient was not benefited. In that case he did not believe incision of cord would have helped. Experimental work of Dr. Allen on traumatic cases has shown us the proper direction in which to work. In Dr. Taylor's three cases in which he got the best results, Dr. Sachs believed the reason was his very free incision of the cord.

Dr. Alfred Reginald Allen said, in the last volume of Keen's system of surgery Dr. Halstead, who has written the section on neurological surgery, states that the objection to the method of incising the cord in the median line, is the fact that you thereby get a very serious loss of sensation. Of course, when one realizes that the incision is only about a centimeter and a half in length, and when one bears in mind the overlapping of distribution in that spinal segment areas of cutaneous sensibility, it will be readily seen that there would be no symptom of sensory loss that one could discover after such a section. In other words, realization of normal physiology in this regard quite sets aside Dr. Halstead's objection.

In answer to Dr. Sachs' question, Dr. Elsberg said that in the last two years he had several times done laminectomy where no lesion could be discovered and that three of these patients were entirely relieved of their symptoms without incision of the cord. He believed the cord should not be incised in the median line, but just to one side of the posterior median septum. If the incision is made in the septum, injury to small

¹ Two cases of Spinal Surgery by F. X. Dercum and J. William White, *Annals of Surgery*, June, 1889.

bloodvessels cannot be avoided, and every drop of blood is dangerous. One can incise the posterior column for a length of five or more centimeters with perfect safety.

Regarding the three patients who improved, two of them recovered entirely after the exploratory operation. He mentioned one case, a patient of Dr. Bailey's, who was in the New York Neurological Institute three or four times in the course of a year, who had been steadily getting worse. He was supposed to have a multiple sclerosis, with dissociated loss of sensation to the fifth or sixth dorsal level. He was very spastic. There was an indefinite sensory level, and at the patient's urgent request, an exploratory operation was done. The findings were negative excepting for a little irregularity of the cord itself. It is now four years since the operation, and for the last three years he has been perfectly well. Dr. Elsberg presented him to the New York Surgical Society a few months ago—that day he had taken a ten-mile run. For some months after the operation, his condition was not improved; from that time on, his symptoms gradually grew less. He is perfectly well at the present time, and examination fails to reveal any evidence of this former disease. This is a remarkable case, which we do not yet understand. Dr. Bailey and he had suggested that the results, in these patients—in whom nothing is found at operation, and in whom all of the symptoms disappear,—may be due to changes in the spinal circulation due to the entrance of air into the spinal canal. The fact that some patients are cured of their spinal symptoms by the mere laminectomy must be considered proven by their experience. Among seven cases, they had had three entirely recover after "decompressive laminectomy."

Dr. Patrick said another condition, quite different from these cited, for which laminectomy may be indicated is old *specific* meningo-myelitis. Last year in London he found that at the National Hospital a number of cases had been operated upon, sometimes with excellent results. In some of these cases it seems that the adhesions cause local collections of fluid comparable to cysts. Pressure from these collections causes part of the symptoms, which part is removed by operation.

Dr. A. S. Taylor said one is dealing with an inflammatory condition in a tissue which is confined in a connective tissue canal with a bony canal outside. The indications are to relieve pressure by decompression and drainage and get results in that way.

POST-LITIGATION RESULTS IN CASES OF SO-CALLED TRAUMATIC NEUROSIS, TRAUMATIC NEURASTHENIA, TRAUMATIC HYSTERIA: NATURE OF THE AFFECTION TO WHICH THESE TERMS ARE APPLIED

By F. X. Dercum, M.D.

Importance of the subject to the individual, the corporation and the community. Damages awarded are added to the cost of service, operating of plants and production generally. Eventual cost falls upon the community. Deductions drawn from 605 traumatic litigation cases personally examined and recorded for prosecution or defense; of these 126 consisted of physical injuries; unreal and unessential character of the symptoms in

the remainder; references to Babinski's views of hysteria; hysteria always an innate affection; always pre-existing in the individual; persistence of symptoms until final settlement; then subsidence and disappearance. In not a single instance within the writer's knowledge was rest treatment subsequently carried out. Brief reports of over twenty cases carried into the courtroom on stretchers or chairs at time of trial or "too seriously injured to be brought into court"; in all rapid disappearance of symptoms after settlement. Importance of the recognition of the truth by legislators. As a matter of fact the law should insure compensation for *physical injuries only*. Hysteria not evoked by physical trauma, but by fright and subsequent preparation for litigation. In Pennsylvania the law had already made an important advance; compensation for fright not allowed. If no damages are allowed for fright, damages for hysteria should also, and logically be excluded. Brief reference to conditions abroad.

Dr. Patrick said that a few years ago he with a group of physicians was going through a ward of the Salpêtrière with the attending physician, when they passed a woman apparently just winding up a hysterical fit. She was lying on her back diagonally across a bed, head and shoulders drooping over the edge, arms hanging down, disheveled hair sweeping the floor, face livid and puffy, eyes closed, the entire body frequently shaken by something like a convulsive sob. She was a sorry sight. And no one was paying the least attention to her. Patients were quietly knitting, sewing or reading; nurses going about their duties. The group of physicians passed without stopping and without comment. Presently one of them asked, "Hysteria?" "Yes," said the Professor. "What do you do for it?" "Nothing at all. In the old days when every phase of an attack was observed and recorded and the patients were frequently examined and demonstrated, they had their fits regularly and remained here for years; sometimes twenty or more. Now we let them severely alone and they are discharged in a few weeks." This incident, it seemed to Dr. Patrick, is pregnant with meaning, or a moral if you like, which each can readily grasp for himself.

His hope is that the members of this association will express publicly and generally to lawyers, legislators and the laity at large that these employers' liability laws, although they may be legal, sociologically expedient and even just, will add to the invalid list enormously, continuously and increasingly.

No one who has had the opportunity and taste to observe the huge host of invalids, invalidated and quasi-disabled of Germany, can help being deeply impressed by the tremendous burden carried by that nation; a burden that in his opinion must exceed their fearful military load. And we seem to be walking right up to that selfsame national calamity.

Dr. D. J. McCarthy said, in this, as in other questions, there is danger of wide, sweeping, broad conclusions which are not justified entirely by facts. He thought every one who is dealing with neuroses must necessarily, after years of litigation, find persistent symptoms. He has a patient who years after the accident, presents the results of these disturbances, the case having been settled years before in court. He quite agreed with Dr. Dercum in his main conclusions and had so testified in law courts in cases of hysteria—some of these cases might get well two or three months after litigation had ceased. The general attitude of the profession is, as Dr. Dercum has expressed it, towards those cases.

Dr. Adolf Meyer thought it is of the greatest importance that the association should take a clean-cut attitude upon this question because it is indeed a danger to the present civilization to allow this matter to be put on the mere ground of temporary economy and emotional reaction on the other end which is back of a great deal of legislation in favor of one class or the other. We are on the verge of a great deal of class legislation, probably more than anybody dreams of who has not seen similar things going on in other countries. He believed the bulk of it is produced by a certain amount of injustice which calls for complaint, just such as Dr. McCarthy has indicated. It is utterly unfair to say that one should have compensation remitted for physical injuries only. After all, what is "physical injury"? Why should we not acknowledge the "physical" character of serious shock? It no doubt would be convenient to eliminate from consideration those effects which might at times be questionable and too transitory; but excessive promptness will ultimately lead to over-compensatory legislation and emotional jury verdicts. It is urgent that we should make a strenuous effort to eliminate protracted litigation. Moreover, we should urge that in order to get any right to the time and privileges of a court, written reports of the medical findings in the cases be required. Without written reports we shall never get any foundation for a professional criticism of the work of the men involving themselves in this work, since physicians can too easily hide the most misleading and incorrect statements behind the claim of having made the objectionable statements in answer to hypothetical questions. If the reports are direct and in writing, we can hope to pillory and eliminate a certain type of expert.

Dr. Knapp said he should have less difficulty in accepting Dr. Dercum's conclusions in part, if he did not take quite such a pronounced position. If he found only one case out of 605 that did not improve, Dr. Knapp could accept his conclusions with a little more confidence, but as the whole 605 got well immediately, he thought that his attitude is certainly extreme. The whole question is one which has been treated with fundamental dishonesty, of course, not so much on the part of the medical profession, as on the part of the lawyers who are essentially dishonest on whichever side they are on. No lawyer can be honest. The plaintiff often goes into court against a bribed jury and with perjured testimony against him; certain corporations have been guilty of such conduct and they have been caught when attempting to influence juries. Dr. Knapp had reported a number of cases himself, and had followed out, not 605 cases, but a very considerable number after the award had been given,—he had had patients come to the hospital for treatment, who had suffered for several years after their cases were settled. He had seen and followed up a considerable number of such cases. In some attempts to study them obstacles were thrown in the way on all sides, by the railroads as well as by the attorneys. There are certainly cases that never make a complete recovery; some cases which have gone on and died; and others which, of course, improved and got entirely well. The startling recovery as soon as damages are paid is distinctly rare, the plaintiff sometimes has improved before the case is settled in court. He thought Dr. Dercum's position in the matter is certainly extreme. We ought to study our cases thoroughly and follow and investigate personally a certain number of cases. We should then know a great deal more about the matter than we do from the statements from the attorneys on one side or on the other. The present law in regard to employers'

liability which has been in Massachusetts for a short time, he had had very little personal experience with. It did seem to him it is opening the way to a considerable burden upon the community, although in some respects the burden of litigation is somewhat lessened. The suggestion that Dr. Dercum brought forward seems not only an exceedingly radical but absolutely unjust proceeding.

Dr. Fry said, a phase of this question occurs to one in reading articles similar to Dr. Dercum's, and in practical contract with cases, namely, the moral or liability side of it. The traveling public is not protected any too well at best. Furthermore, we all know that common carriers, and other corporations liable for damages, have today less fear of broken bones, and similar physical injuries than they have for so-called shock cases, etc. The effort on the part of corporations to prevent this latter kind of accident is responsible for much of the protection that we do get. This is an important consideration. We cannot afford to throw down bars of this kind in too rapid a manner. The matter must be gradually adjusted until something nearer to justice to both sides may be possible.

Dr. J. W. Putnam called attention to the fact that hysteria is not the only disease which has its origin outside of the spinal tract. Prior to an accident there is no physical evidence of injury being observed, but how rapidly can an ophthalmic goitre develop after the accident. It is a disease which we all know lasts a very long time, is not especially successful to treat and is not improved after money is paid over. We must remember that Dr. Dercum's plea that only physical injuries should be paid for will not apply to that class of cases. Traumatic insanity he had seen also, choreas he had seen, and so a good many conditions or nervous conditions which are of a functional character including Parkinson's disease, all due to accidents which caused no physical evidence of injury.

Dr. Pearce Bailey said, several years ago he might have agreed with Dr. Dercum in many of his conclusions, but from experience he had, had recently been inclined to agree with very few of them. Instead of hysteria being a menace to this country, in his part of the country it is rapidly disappearing from the courts, due to two reasons. One is—chief reason—the organization on the part of the railroads and the insurance companies. Both now have very expert physicians and adjusters who interview the injured people immediately after the accident; if no period elapses for the working up of revengeful feeling the traumatic neurosis will rarely develop. He had come to this view from his own experience and from conversation with representatives of most of the railroads in New York and of the insurance companies.

The question of fright as a cause of action is one of public policy. In no state, did he understand fright to be the cause of action. In New York, fright is a cause of accident when combined with some physical injury, and this ruling is effective in most of the states.

Locomotive engineers have hysteria and railway postal clerks are particularly susceptible to fright, and among athletes, particularly football players, Dr. Bailey had seen cases of functional disturbance. Recovery coming immediately after payment has been made, has not been his experience; in the majority of cases that have recovered, functional capacity for work has only been regained after a good many months, in some cases two or three years.

One question Dr. Dercum did not bring up at all which is extremely

important, and that is the cases in which the hysteria develops as an indirect consequence of the accident. The accident simply serves, as a means of subliminating, as it were, a functional nervous disease from which the patient already suffers. There are a great many examples. A woman was injured by the collision of a ferryboat about three years ago. She immediately fell down with the symptoms of paraplegia and from that time to this has never walked. Physical examination was made and showed the condition was not due to the accident at all. Her mother-in-law lived in the house and her life was very unhappy. She came under Dr. Bailey's care to the Neurological Institute for a number of months. The case was settled fully eighteen months ago. But the mother-in-law still lives in the house and the woman is still helpless.

Dr. Diller said, not very long ago, he went to considerable pains in examining one hundred damage cases which had come under his observation. His conclusions, in the main, were in accord with those expressed by Dr. Dercum. But he felt that Dr. Dercum's position is too extreme and that he does not make as many qualifications as should be made. In his own cases there was generally little or no improvement before damage claims were settled; but every now and then some improvement did occur and in very occasional cases this was considerable. There is a very great handicap in the way of treating these patients while a damage case is pending. Indeed in many cases the treatment is harmful rather than not. The patient not improving under treatment, blames his lack of progress on his disease rather than on his physician. And if he happens to be under a skilled physician, such as Dr. Dercum, this feeling is so much the stronger. He is fortified in the mental impression that the disease is severe and permanent since it resists all the efforts of such a competent physician. Seldom or never does a patient return to the office for treatment after damage claims have been settled; and one does not hear of these patients taking treatment of any sort. They appear to be discouraged and drift along doing as best they can. Dr. Diller sent out a number of circular letters and received quite a number of replies and reexamined quite a number of patients. He had Dr. Dercum's experience in that some patients resented these inquiries. He did not learn of a single instance where sudden recovery had occurred after damage claims had been settled. On the other hand, his conclusion based on a considerable number of patients examined and whose reports he received, was that there was, generally speaking, a gradual improvement after damages were awarded. This improvement was much more marked than before settlement. But he found several cases in which symptoms were quite marked, one, two or three years after the damage claims had been settled.

While mental and nervous symptoms, such as are commonly seen in damage cases, do not often occur after accidents where there is no claim for damages, yet they do occasionally; he had seen several typical cases of this sort.

While the law of Pennsylvania holds that no claim for damage can be maintained for symptoms resulting wholly from fright, yet if physical injuries do occur then mental symptoms resulting therefrom must be reckoned with. These are the symptoms with which we have chiefly to do in these cases. If A. B. is in good health, pursuing his usual occupation and is injured in a railroad wreck and afterwards suffers from many neurasthenic or hysterical symptoms, these must be fairly attributed to the accident. These

symptoms are as real as any and the individual is fairly entitled to damage claims. In nearly all cases seen by Dr. Diller, the patient exaggerated his symptoms, some moderately and some grossly, but he did not recognize a single clear-cut case of malingering. As to the exaggeration, one must recognize that this is a common tendency in all kinds of sickness. While it is perfectly true that many of these traumatic neuroses would never have occurred had the individual not suffered from a neurotic temperament, on the other hand such an individual might have gone on through life without showing marked nervous symptoms had it not been for the accident. He felt the company in such cases is entitled to pay damages, although they should not be excessive. There are two sides to this question and it cannot be settled offhand by any radical declaration.

Dr. Richard Dewey desired to ask Dr. Dercum whether the line of procedure he advocates with regard to personal injury claims if carried out would not have the effect of penalizing the nervously unstable for their own nervous instability. The consequences of shock or fright are certainly more serious in a neurotic person. This is a matter for which neither the corporation nor the injured individual is responsible. The effect of identical external condition will differ according to the physical and mental constitution. The fact that some persons make fraudulent claims does not change the reality of the genuine ones.

Dr. Knapp wished to correct a little misunderstanding. The law is essentially dishonest because it admits only those facts which comply with the rules of procedure, just as the doctor accepts only those facts which fall in with the accepted plan of salvation.

Dr. Dercum said he expected to meet with differences of opinion regarding this subject but the facts as to the outcome of litigation hysteria after settlement are such that they cannot be disputed. He could not confirm the statements of Dr. Bailey as to the disappearance of traumatic hysteria from the courts. Certainly this is not the case in Philadelphia in which these cases are numerous. It is important in studying a case of accident hysteria to bear in mind what he said in his paper with regard to the pre-existence of hysteria in accident cases. In the vast majority of these cases we have evidences unmistakable in character that the hysteria long antedated the accident. He might cite case after case to prove this point. In every instance in which the symptoms of hysteria failed to subside after settlement, as in the case cited by Dr. Bailey, special causes are at work as is clearly shown in Dr. Bailey's case.

(To be continued)

Translations

VAGOTONIA

A CLINICAL STUDY

BY PRIVATDOZENT DR. HANS EPPINGER, AND DR. LEO HESS

OF VIENNA

TRANSLATED BY WALTER MAX KRAUS, A.B., M.D., AND
SMITH ELY JELLIFFE, M.D.

(Continued from page 737)

While considering intestinal disorders, it may be permissible to put in a few words about acid jejunal diarrhea. We do not wish to discuss the pathological basis of this singular intestinal disease, but merely to call attention to the fact that the increased peristalsis and the frequent complication of gastric hyperacidity recall a state of increased irritation in the autonomic nervous system. Due to the increased production of acid, the digestion of starches is hindered, more work is required of the intestinal tract and at the same time the acid ingesta mixed with the undigested carbohydrate becomes a stimulus to the intestinal mucous membrane. Atropin to counteract the hyperacidity and restriction of the carbohydrates are good therapeutic measures for this kind of fermentative dyspepsia. It must be left to further investigations of these cases to discover other symptoms referable to autonomic hypertonia.

Mucous colitis often develops on the basis of a long-standing habitual constipation. There are transitions between true mucous colitis and membranous enteritis (true inflammation). Mucous colitis, in the narrower sense, is an intestinal neurosis, in which an anomalous secretory activity exists in addition to the increase of peristaltic action. The stools are mixed with an abundance of mucin. When we consider this disease we almost involuntarily think of the action of pilocarpin upon the intestine of rabbits. At the height of the action of the pilocarpin the animal evacuates not only large amounts of feces, but also characteristically glairy,

tenacious mucus which is as coherent as a band. Our viewpoint is strengthened on considering that atropin has proved a most efficacious therapeutic agent in mucous colitis.

Eosinophilic catarrh seems to be the analogue of mucous colitis, occurring in more distal parts of the intestinal tract. This disease resembles mucous colitis in all but one of its characteristics (eosinophils). Its name recalls the relation to eosinophilia of other diseases which symptomatologically and etiologically appear to be due to autonomic irritation, as, for example, bronchial asthma and Teichmüller's eosinophilic catarrh. Not only in mucous colitis but also in eosinophilic rectal catarrh²⁰ were we able to find evidences of vagotonia. This was found in the most distal segment of the intestine as well as in other parts, in which it manifested itself as salivation, bradycardia, a tendency to sweat, etc.

A laborer, age 27, noticed for the first time two years ago that at the end of defecation, there appeared bright red blood mixed with mucus. For the last six weeks he had had frequency of defecation, accompanied by distention and sensations of gas in the abdomen. Pure blood unmixed with feces is sometimes expelled with the gas. The blood is yellow-red, and is often intermingled with streaks of darker blood. At these times the stool is retained.

The patient looks healthy, the mucous membranes are a bit pale, the hands are moist, perspiration appears on the face and head at the slightest physical exertion. Pulse rate 64-80, tonsils large, not reddened. Internal organs are normal. The stool, which is firm, is surrounded by a slimy purulent coating, which is shiny and thick.

This shows on microscopic examination, shreds of mucus, epithelial cells, lymphocytes, blood corpuscles and very many eosinophils. Rectoscopic examination shows a dark-red mucous membrane with a patchy appearance. On this surface, are many large and small yellow-white masses. Microscopically, these prove to be a mixture of eosinophil leucocytes, extracellular granules and Charcot-Leyden crystals. Blood examination shows an eosinophilia of 6.3 per cent.

Pharmacological Tests.—Pilocarpin gives a strong reaction, atropin a moderate reaction, adrenalin causes neither glycosuria nor vascular symptoms.

Spastic constipation is a frequent finding in vagotonic individuals. Since atropin has a very favorable effect upon this condition, moreover, since spastic states in the circular colonic musculature are certain and spastic states in the rectal sphincter are known to play a part, we are inclined to attribute this disease to autonomic irritation. Several signs are necessary for a diagnosis of spastic constipation.

These are: diminution in the volume of stool combined with diminished water-content and perhaps increased resorption; spasm

²⁰ Neubauer, O. and Stäubli, Münch. med. Woch., 1906, No. 49.

of the circular muscle and frequently an increased secretion of mucus in the stool.

On casual observation it would seem foolish to ascribe two such opposite conditions as constipation and diarrhea to the same cause. We believe, however, that the same etiological factor is operative, only in one instance the circular, in the other, the longitudinal muscle is affected. We find a similar state of affairs in the stomach, for here also spastic states and hypermobility are referable to the same underlying cause. At all events the behavior of the nerves to the intestines are exceptionally complicated, due to the presence of the mesenteric plexus. Besides, an attempt should be made in each case to separate peripheral from central vagal stimuli. Many observations in pharmacological literature show that there may be important differences in this connection. The frequent occurrence of spastic constipation in vagotonia, the above-mentioned beneficial effects of atropin, and finally the not unusual transition from a spastic obstipation to a diarrhea, leaves this idea of its cause on firm ground. The complete comprehension of this disease must be left to further researches.

The vagotonic manifestation of irritation in the domain of the *heart* may be very varied. The most dangerous disease, which may involve the heart, due to increased vagal impulses, is a disturbance in the transmission of the cardiac impulse—conduction disturbances—or heart-block. As is well known this does not imply a complete interruption of the conduction of the impulse from auricle to ventricle, but a condition in which several auricular impulses occur before one finds its way through to the heart. Consequently the number of auricular beats is a multiple of the ventricular beats. In such individuals previous to or in the early stages of the disease, the heart rate is slow. It is typical of this disease that it may be relieved by atropin, while a true heart-block (Stokes-Adams disease), based on anatomical changes, that is, a complete dissociation between auricle and ventricle is but slightly or not at all affected. The pulse-rate changes but little or not at all. It is important to recognize this because it is in them that the vagotonic action of digitalis acts very unfavorably and may indeed produce some of the symptoms of the disease, while others it may aggravate (Wenckebach). Not only in these cases but whenever digitalis is used, there is often the chance to note the undesirable

complications subsequent to its administration and due to its vagotropic action.

The relatively early appearance of bradycardia, and perhaps also disturbances of the stomach and intestines are signs that in certain individuals an exceptional irritability in the realm of the autonomic exists: atropin is an excellent adjuvant to digitalis therapy in such cases. Just as there are individuals who react to excitement by means of a physiological tachycardia, so also there are those who react in reverse fashion; that is by a bradycardia (neurogenic). This condition is frequently associated with diminished blood pressure, and by reason of a bradycardia and lack of cyanosis, may be differentiated from the organic insufficiencies of the heart, which are associated with tachycardia and cyanosis. It has been observed that this clinical syndrome appears in the course of, or during the convalescence of certain infectious diseases, both in the juvenile and in the adult epochs of life, particularly when a fatty heart exists. A particular form of bradycardial hypotonia is found in certain cases of exophthalmic goiter. (M. Hertz).²¹

There may also be a transient bradycardia in certain forms of goitrous heart. The vascular hypotonia as described by S. Münzer²² may be a similar disease. Many of the clinical histories, which he has cited, strongly reminds one of the findings which have been made in typical vagotonics. It is also noteworthy that Münzer often found associated stigmata of status thymo-lymphaticus. It is well known that bradycardia always occurs when the tone of the vagus is altered by any organic process, as, for instance, neuritis or compression, or by peripheral stimuli, as, for example, tracheotomy, laryngoscopic examination, etc. Frequently there are manifestations of irritation in branches of the vagus other than those supplying the heart.

Angina pectoris vasomotoria is certainly neurogenic in origin. If it is to be considered as a spasm of the coronary vessels it becomes necessary to regard the spasm as due to an increase of vagal stimulation since the constrictors of the coronary vessels are innervated by the autonomic nervous system. It is just the nervous form of angina pectoris, which is associated with many other manifestations of vagotonia, a fact which makes it difficult to regard this disease otherwise than we have suggested.

²¹ Hertz, M., Über bradycardische Hypotonie, *Med. Klin.*, 1910, p. 763.

²² S. Münzer, Vaskuläre hypotonien, *Wiener klin. Woch.*, 1910, No. 38.

Similar nervous influences may be a causative factor in organic stenocardia, and it is just in this disease that we may find vagotonic manifestations of irritation as bradycardia, paroxysms of sweating, as well as gastric and intestinal symptoms. Later we shall discuss the etiological nexus, which exists between this condition and the climacterium in which the disease is frequently found.

Cardiac Neuroses.—The symptomatology of these conditions is very variable and it is exceptionally difficult to explain all their manifestations on the basis of a single cause. Marked lability of the heart action, variations in the pulse rate, even after the slightest physical or mental exertion, extra systolic arrhythmias and the very many other nervous manifestations, not of a cardiac nature, which belong in many cases to the picture of a cardiac neurosis, make it almost impossible in any given case to explain all its symptoms on the basis of a single cause. Thus it happened that Krehl²³ advanced the suggestion that it would be wise to collect clinical observations without considering the significance of the various nerves and ganglia of the heart until more knowledge should have been gained. But since pharmacological testing of visceral nerves has given us the opportunity to discover conditions of irritation in the two antagonistic systems, it appears possible for us to separate etiological principles for the cardiac neuroses on the basis of the tonus of the nerves regulating the heart action. In accord with this idea, we may postulate both a vagotonic and a sympathotonic cardiac neurosis. Finally it is conceivable that there may exist in both cardiac nervous systems a condition of hypotonia similar to that found in many cases of exophthalmic goiter and catatonia. It would be premature to give any final judgment, in this perhaps the hardest chapter of visceral neurology, yet it seems certain that there are cardiac neuroses in which all the symptoms are referable to an increased functional activity of the vagus. Thus there are cases, so-called neurasthenic cardiac weakness, in which besides painful sensations in the neighborhood of the heart there exist marked respiratory arrhythmia, even disappearance of the pulse during deep inspiration, cor mobile, dermatographism, enlargement of the tonsils, Aschner's pressure phenomenon and asthmatic attacks with expectoration of a tenacious sputum con-

²³ Krehl, L., Ueber nervöse Herzerkrankungen, Münch. med. Woch., 1906, No. 48.

taining Curschmann's spirals. In these cases the point of maximal impulse of the heart is heaving and pushed outward. It is interesting that in such cases atropine may relieve not only the respiratory arrhythmia, but also the high grade tachycardia, a symptom which does not seem to belong to the same group as the others. The syndrome described by M. Herz,²⁴ bradycardial hypotonia belongs also, according to our own observation, under the heading of vagotonia. Phrenodynia, temporary respiratory suspension,²⁵ irregularity of the pulse, marked mobility of the phrenocardiac heart, beside spastic constipation, which so often accompanies these, may all be considered part and parcel of vagotonia. It is our own impression also that certain cases of goitrous heart, with relative bradycardia, dermatographism, tendency to sweating, weak dicrotic pulse, moist eyes, and widely opened palpebral fissures, which conceal an exophthalmus, owe their existence to a pre-existing vagotonic constitution upon which a secondary thyroidism is engrafted. These cases have been put under the caption of *Vagotonic Goiter Heart*.

Briefly stated, it may be said that we have tried to show in the foregoing pages that certain stimuli may be super-imposed upon a vagotonic constitution, and that these lead to diseases whose characteristic course shows that their most prominent symptoms are those of autonomic stimulation. The significance of this is that we learn to recognize a definite relationship between certain symptoms occurring in the most various organs, a relationship whose origin lies in etiology and that by means of apparently insignificant symptoms we are enabled to recognize the cause of a disease, and are enabled to influence it therapeutically.

For those in whom we feel that there exists a generalized disposition to the vagotonic state, as well as those in whom some disease of the vagotonic type has been superimposed upon a vagotonic constitution, there are frequently to be found certain stigmata which are not closely related to this constitutional anomaly, and which are not referable to the same etiology. However, these stigmata are of such frequent findings that they may almost be regarded as characteristic earmarks of vagotonia. They are so apparent that they often lead us to a diagnosis of vagotonia. We

²⁴ Herz, M., l. cit.

²⁵ Herz, M., Die sexuelle psychogene Herzneurose (Phrenokardie), 1909.

have probably made it clear by what we have said in the foregoing pages, that when we deal with vagotonics we are, as a rule, also dealing with "nervous" people. Neurasthenic and hysterical complaints are often the apparent basis of the trouble and so there is little cause for wonder at the fact that physicians have regarded the symptoms, which we have described as vagotonic, as the manifestations of an hysterical or neurasthenic constitution. Without entering into a discussion over the justification of confusing hysteria and neurasthenia with vagotonia, we may say that the hysterical component, at least, is often absent in many vagotonics. As far as the neurasthenic stigmata are concerned, it is worth saying that there is a definite group which may be separated from them, which can be accounted for on the basis of one etiology. This fact may throw some light upon the condition known as neurasthenia, one which is often very variable and very difficult to circumscribe and diagnose. V. Noorden has described a symptom-complex which he has called—*the hysterical vagusneurosis*. His cases are in many ways similar to those we have described as vagotonic. Since in his cases certain stigmata could be regarded as of hysterical origin, and were generally included among the symptoms coming under the caption hysteria, it is natural that the emphasis should have been laid more on the side of that disease than on that of vagotonia. Typical of all his cases was the lack of the pharyngeal reflex. This symptom is, however, so frequent a finding in vagotonics, without any hysterical stigmata, that we are inclined to reject hysteria as the cause of it in these cases. On physiologic grounds, this symptom cannot be brought into relationship with vagotonia, since the region which is anesthetic when the pharyngeal reflex is lacking is supplied by the glossopharyngeal and trigeminal nerves.

Another symptom frequently found in vagotonics is moist hands and feet. Here also a physiologic explanation is difficult. It is relatively easy to account for sweating, but to account for the localization is not so easy, and all that may be said is that there is a localized stimulation of autonomic fibres. The erythematous appearance of these areas [extremities] is usually regarded as vasomotor in origin. But the relationship existing between vasomotor and visceral nerves is not yet entirely clear, though there is much evidence to prove that the vasodilators are supplied by the autonomic nervous system. From this point of view cyanotic,

moist hands are signs of vagotonia. Hands so affected are often large and the fingers long and thin. The same applies to the feet, which, in addition, may be flat.

We shall attempt no explanation of myopia, a frequent finding among vagotonics. Enteroptosis is often found combined with the general nervous state of these people. Long, chest, costal fluctuantes, cor mobile, even cardioptosis, palpable kidneys, and even prolapsed uteri are also frequent findings. Both men and women may show some signs of enteroptosis. The abdomen is often small above, wide below, while the abdominal wall is lax and poor in muscle. Not infrequently the women have both a masculine form and a masculine distribution of hair. The pubic hair is not horizontally delimited, but extends upwards towards the umbilicus. There may even be curly, upright hairs on the linea alba above the umbilicus. These women have small, underdeveloped breasts with large nipples around which a ring of hair may be found.

(To be continued)

Periscope

Brain

(Vol. XXXVI, Part I)

1. Parasyphilis of the Nervous System. JAMES MCINTOSH and PAUL FILDES, HENRY HEAD and E. G. FEARNSIDES.
2. The Brain of a Macrocephalic Epileptic. J. WIGGLESWORTH and GEORGE A. WATSON.
3. The Relation of the Myopathies. WILLIAM G. SPILLER.

1. Parasyphilis of the Nervous System.—The authors of this paper state that it is a preliminary communication, based upon several lines of work, carried out simultaneously in the wards, and in the bacteriological laboratory of the London Hospital. Each separate research will form later the subject of a paper, to be published in *Brain*, but they have thought it wiser to give a preliminary account of their general conclusions before presenting the various more special and detailed communications.

The results embodied in the paper are based entirely on cases where the serological examinations have been carried out by Dr. Fildes and Dr. McIntosh, and the clinical records compiled by Dr. Head and Dr. Fearnside. Von Pirquet's conception of "allergie" opened a line of thought which led McIntosh and Fildes to formulate the view which the authors hold with regard to the nature of parasyphilis. Von Pirquet showed that all infections led to a change in the character of the reaction of the tissues to the poison. This might take place in two directions; they might respond less and less to infection ("hypoallergie"), until at last they ceased to respond altogether and became "anergic." But, on the other hand, a change in the opposite direction might occur; the reaction might appear both more quickly and with greater violence to a smaller dose of the poison. This he speaks of as hyperallergie and brought into this category the phenomena, described by Richet, under the name of "anaphylaxis."

In their view tertiary and "parasyphilitic" phenomena are manifestations of hypersensitiveness ("hyperallergie"), which reaches its extreme form in anaphylactic shock. As the tissues are hypersensitive, they react more strongly to a minute dose of the poison, and hence some of the difficulty of discovering the spirochete in gummatous and parasyphilitic tissues.

The difference between the anatomical consequences, produced by the impact of the poison of the two cases, depends on the nature of the tissue attacked. Thus, gummatosis is the reaction of hypersensitive vessels and connective tissue, parts which tend to show proliferative changes. On the other hand, the pathological anatomy of "parasyphilis" of the central nervous system is the expression of the response of hypersensitized, highly differentiated nerve-elements which have no power of regeneration. The profound difference between the two forms of disease-process depends, not on the extent to which the tissues have become hyperallergic, but on the fact that, in the one case, proliferative repair can occur at once, whilst, on the other hand, the injury to the nerve-elements results in their death. This

view explains the fact that "parasyphilitic" processes occur in those nerve fibers in which the sheath of Schwann is absent. This structure is not only an essential factor in the process of regeneration, but also, no doubt assumes a nutritive or protective role, to such an extent that a reaction which is sufficient to destroy a nerve-fiber not provided with this sheath may be insufficient to injure to any extent the nerve protected by the neurilemma.

This theory also accounts for the occasional presence in the same patient both of gummatous meningitis and of "parasyphilitic" degeneration; the one is the reaction of a highly sensitized connective tissue, whilst the tabetic changes are the expression of a similar condition in the long fibers of the posterior columns.

On this view we can also explain the peculiar course of the milder forms of parasyphilis. The tendency of many cases of tabes is to run on somewhat acutely to a certain stage and then to stop, frequently for many years. This is particularly well seen where the first manifestations take the form of primary optic atrophy, which leads invariably to complete blindness; but from that time onward the patient may remain free from any further affection until, perhaps many years later, his knee-jerks disappear, or he suffers from some cerebral complication.

The conclusions arrived at in this important paper are as follows: (1) Parasyphilis of the nervous system is a purely clinical conception. It is a diseased state which may affect any part of the brain or spinal cord; the manifestations of tabes and paresis can only be erected into two clinical divisions by an arbitrary selection of signs and symptoms. Some forms of progressive muscular atrophy, lateral and combined sclerosis, primary optic atrophy and periodic epileptiform attacks may be equally definite manifestations of parasyphilis. (2) Parasyphilis is slightly, if at all, amenable to antisyphilitic treatment with compounds of arsenic and mercury, probably because these bodies do not enter the essential structures of the central nervous system. (3) Parasyphilitic states are peculiarly liable to arise after mild syphilitic infection. Sixty per cent. of cases of tabes have suffered from at most a primary sore, and in many cases the whole course of the initial infection was run under cover of a gonorrhea. (4) In paresis, and in active, untreated cases of tabes, and tabo-paresis, the cerebrospinal fluid yields a positive Wassermann reaction, often of great strength. (5) With acute or chronic syphilis of the nervous system, other than parasyphilis, the behavior of the cerebrospinal fluid depends upon the extent to which the spinal cord and its membranes, including those of the brain-stem, are affected. Thus, most cases of meningomyelitis show a strong positive reaction in the cerebrospinal fluid, whilst cerebral lesions tend to give a weakly positive or even a negative reaction. (6) Antisyphilitic treatment has a profound effect on the positive reaction in syphilitic meningomyelitis, and the cerebrospinal fluid may give a negative reaction after a few months. But in cases of parasyphilis no positive change occurs in consequence of such treatment, within any comparable period. (7) Whatever views may be held of the primary and secondary manifestations in syphilis, the authors believe that all tertiary and parasyphilitic manifestations are expressions of the reaction of hypersensitized tissues (hyper-allergie). That is to say, during the previous stages of infection, the tissues have been so altered that they react more violently to a smaller dose of the spirochete or its toxins. Gummatosis is the reaction of hypersensitized connective tissues and bloodvessels, whilst parasyphilis is a hyperaller-

gic reaction of the essential nerve elements and neuroglia. (8) The consequence of this hyperallergic reaction in the tissues of the central nervous system is death of any set of fibers or cells which happens to be attacked, and proliferative reaction on the part of the neuroglia within the same territory. Thus, the clinical manifestations of parasyphilis are an expression of the reaction and necrosis of hypersensitized areas of the nervous system, evoked by reappearance of the *Spirochæta pallida*. (9) This hyper-sensitive (hyperallergic) state of the tissues of the central nervous system is produced, in all probability, by the passage of the spirochetes or their toxins up the nerves from the skin and mucous membranes during the secondary period. But it is also conceivable that it may be due to a slight encephalitis during this stage of infection. The headache and lassitude, unaccompanied by any gross nervous lesions, which so frequently occur during the secondary stage, possibly represent clinically the period during which sensitization occurs. (10) Thus, parasyphilis is a clinical conception which comprises the manifestations of a series of diseased states. From the pathological point of view the term is inadmissible. These states depend on the reaction of hypersensitized tissues to the spirochete or its toxins, and this reaction is as truly syphilitic as the production of gummata. The difference between the consequences of the tertiary and of the parasyphilitic process lies in the nature of the tissues participating in the reaction. In the one case the connective tissue is capable of repair, and the focus is readily reached by the remedial agents. In the case of parasyphilis, reaction of the essential nerve-elements leads to their death, and the anti-syphilitic remedies cannot readily reach the spirochete.

2. *The Brain of a Macrocephalic Epileptic.*—The writers give a short history, and complete notes on the autopsy of the subject of this paper, a male epileptic, who was admitted, at the age of 28, in August, 1901, into Rainhill Asylum and who died there in January, 1910. His occupation was that of a piano tuner. His family history was good. His father was an intelligent man, a Nonconformist minister, and there was no record of psychoses, epilepsy, or allied neuroses in the family. The patient himself had always enjoyed good health and had never had any serious illness except an attack of pleurisy. He was bright and intelligent as a child and early showed promise of great musical ability, but he was always of a nervous, excitable disposition. At the age of 9 years he seems to have had an attack of petit mal, but the first distinct fit occurred when he was 16, and since that time he remained subject to epileptic attacks at variable intervals. For about a year before admission, the parents of the patient had noticed a gradual mental deterioration, which doubtless had been coming on insensibly for some time previously, but no attack of an active psychosis occurred until ten days before admission, when he became delusional, excited and threatening, which necessitated his removal to the asylum. He was on admission a man of good physique, 5 ft. 10 in. in height, and over 168 pounds in weight, with all his viscera apparently healthy. The limbs were well formed and symmetrical; there were no deformities of any kind. The circumference of his head was 25 inches. His mental condition was one of partial dementia. He was dull and weak-minded generally, slow of speech with prolonged reaction time, but was nevertheless fairly intelligent, could give a good account of himself and was an active worker. His history thenceforward was that of epileptics generally. The frequency of his fits increased in spite of treatment by bromides, so that

whereas in the year 1902 his fits had averaged 5.9 per month, these had increased in 1907 to 9 per month. Along with this went steadily increasing impairment of memory and intelligence; he also had periodical attacks of excitement, lasting for a few days at a time, during which he was violent and dangerous, such attacks usually leaving him on their subsidence somewhat duller than before. Even when at his best he was markedly irritable and quarrelsome and showed much emotional instability. The steady mental deterioration was well shown by the fact that when first admitted into the institution in 1901 he was a useful worker in the place, but by the end of 1906 he had become useless as such, and in 1909 he had not sufficient mind to employ himself in any way. Concurrently with this his health gradually failed, and he finally died of an attack of broncho-pneumonia at the age of 37.

On autopsy the case was found to be one of very pronounced macrocephaly, and as these cases are of comparative rarity the authors came to the conclusion that the record may prove of interest even though the origin of the matter still remains obscure. None of the conditions which have assigned a causal relationship in this connection appear to have been present. The internal secretory glands were unfortunately not preserved for microscopical examination, but to the naked eye these all seemed to be quite normal.

The brain, although one of the heaviest on record, was for the most part normal in appearance differing from the average brain mainly in its increased size and complexity of pattern. The microscopical changes found also did not at all necessarily bear upon the question of cerebral hypertrophy, being merely those usually present in the brains of chronic epileptics. On one point, however, the microscopical examination gave definite, although negative, results. There was no general hyperplasia of the neuroglia such as has been considered to form the basis of cerebral hypertrophy in some cases.

Although there were some indications in places of defective development of the sulci and of reverting tendencies, these were not numerous, nor were they pronounced, probably not more so than are such indications in the majority of human brains, even in those which may be described as generally well developed.

There were, however, in the cerebral hemispheres many signs—apart from their large size—of a formative activity much greater than that usually seen. This increased developmental activity, the authors think, proceeded, for the most part, on regular lines, and on the whole the departures from the ordinary in the convolutional pattern of the brain were in the direction of superiority. On the other hand, the tendency to insulation of areas of the cortex, and the marked spurring and forking of certain sulci, such as was seen particularly in the left temporal region, might probably be looked upon as indications of formative activity on irregular or aberrant lines. With this greatly increased developmental activity, whether in the direction of superiority or aberrancy, it seems likely that there would be a tendency to instability.

It is of interest to note, in this connection, that unlike many other recorded cases of this class, the patient was neither idiotic nor imbecilic, but was originally of at least average general intelligence, with special ability in music. Epilepsy, as in this instance, is a frequent complication in these cases, and this suggests the idea that even when the minute structure of

the brain appears to be normally constituted—which it by no means always is in such cases—the usual size of the brain, apart from the increased complexity of pattern, cannot be largely exceeded without introducing a condition of instability which renders its possessor liable to suffer from some form of nervous breakdown, and especially from epilepsy.

3. *The Relation of the Myopathies.*—The author recognizes two groups of muscular atrophy, (1) the congenital, (2) the acquired. The congenital group embraces the cases of arrested growth in certain limited regions of the body, the infantile nuclear arrest ("Kernschwund") of Möbius. This muscular condition may be caused by defect of the muscles with complete integrity of the nerve apparatus, or, on the other hand, the peripheral neurones may be much affected. The congenital arrest usually is not progressive, although it may be progressive in exceptional cases.

The acquired muscular atrophy also consists of two types, the primarily muscular, with intact nervous system, and the nuclear (neuronic), in which the nerve cells of the peripheral neurones are affected. In the former we have the progressive muscular dystrophy, including the bulbar form of Hoffmann; in the latter we have the Werdnig-Hoffmann muscular atrophy, the infantile bulbar atrophy of Fazio, Charcot, and Londe, and the forms of myelopathy occurring later than the period of childhood. These types, as is well known, are progressive.

The various forms are combined in rare cases, and certain of the muscles of the body, as the pectorals and serratus magnus, show a special liability to arrest or atrophy in both forms. It is also well known that reaction of degeneration and fibrillary tremors, as well as changes in the cells of the anterior horns, have been observed in progressive muscular atrophy, so that sharp distinctions cannot invariably be maintained.

The relation of muscular defect to progressive muscular dystrophy has been recognized by a number of investigators. By some the defect has been considered as arrested intra-uterine dystrophy. In persisting portions of arrested muscles the histological findings have been those suggesting intra-uterine muscular dystrophy, and yet we must be cautious in accepting these findings as conclusive, for it is questionable whether a decision can be formed as to the myopathic or myelopathic character of atrophy from the microscopical findings in the muscles alone.

JELLIFFE.

Review of Neurology and Psychiatry

(Vol. XI, No. 12)

The Direct Ventro-Lateral Tract. W. G. Spiller.—The writer first described this tract in 1898. It was traced at the time as far as the first cervical segment. It arises from the pyramidal tract in the pons or medulla oblongata, and when arising in the latter place it is described as passing backward with the anterior external arcuate fibers, or a little interior to these, on the periphery of the medulla oblongata. After reaching the region of Gowers' tract the fibers of the direct ventro-lateral pyramidal tract bend again downward, and pass in this region to the ventral periphery of the lateral column into the thoracic region, or in one case (Bumke) to the lumbar swelling. Ziehen speaks of the tract as the aberrant ventro-lateral pyramidal tract.

In a case of hemorrhagic cyst in the right lenticular nucleus and external capsule recently studied by Spiller the separation of the direct ventro-lateral pyramidal tract occurred in the medulla oblongata, but in a different manner from that described in Ziehen's summary of the literature. The tract did not pass backward with or interior to the anterior external arcuate fibers, but maintained throughout a longitudinal course. The pyramidal tract fibers extended around the lower olive in its upper part, and spread out in a triangular shape immediately posterior to the olive at the periphery of the medulla oblongata. The outer portion of the anterior pyramid clearly was interrupted by the development of the olive and the anterior external arcuate fibers. The pyramidal fibers which, in the upper part of the medulla oblongata, extended around the olive were gradually completely divided by the olive and anterior external arcuate fibers, so that a triangular zone posterior to the olive was formed without connection with the anterior pyramid.

The direct ventro-lateral pyramidal tract was spread more along the periphery of the cord at the sixth cervical segment than at the seventh cervical segment; at the latter it was very distinct and more triangular in shape. The direct pyramidal tract on the same side of the cord was much degenerated, but was not continuous with the direct ventro-lateral tract. The crossed pyramidal tract of the opposite side was much degenerated, but there was little or no degeneration in the crossed pyramidal tract of the same side. The direct ventro-lateral tract was still distinct at the eighth cervical segment, and of much the same form as at the seventh cervical segment, but was of smaller area. It was not traced below the first thoracic segment.

(Vol. XII, No. 1)

The Nucleus Intercalatus. L. J. KIDD.—The writer divides his article into three parts: Introductory Histological Remarks; Morphological and Experimental Evidence; Summary and Conclusions. His conclusions are stated as follows:

1. The nucleus intercalatus of Staderini consists of small cells of visceral type, is situated in the ventro-lateral primary cell-column of the hind-brain, is a central lateral sympathetic nucleus, is the motor nucleus for the unstriped muscles supplied by the vagus nerve, and has no morphological nor physiological connection with any part of the eighth cranial nerve. That nerve is exclusively a somatic afferent nerve.

2. The axons of the cells of Staderini's nucleus end round cells of the ganglion nodosum, and possibly also the jugulare. The ganglion nodosum certainly, and the jugulare possibly, are really ganglionic complexes, i. e., some of their cells are visceral afferent, some visceral motor.

3. The dorsal vagus "nucleus" is the "endoneural afferent ganglion" (Kidd, 1910) for the unstriped muscle supplied by the vagus nerve; all its cells are afferent; it is not, even in part, an afferent reception-nucleus.

4. The peripheral terminal vagus plexuses consist of four distinct sets of elements, two of vagus origin, and two of sympathetic origin. (a) The older part of the vago-sympathetic system consists of independent, truly autonomic, afferent and motor neurones which form a local independent reflex mechanism; (b) the younger part consists of nerve-fibers which are dependent on influences passing by them from and to the vagi nerves, viz.,

(1) the post-ganglionic motor fibers which rise in the motor part of the ganglion nodosum, and (2) the endoneural afferent fibers (dendrites) which pass down the vagus nerve from the dorsal vagus "nucleus"; (3) the older part of the sympathetic portion of the peripheral terminal vagus plexuses is independent, and forms a local reflex mechanism; (4) the younger part depends on motor and afferent impulses passing respectively from and to the sympathetic system.

5. A renewed experimental and comparative histological study of the nucleus intercalatus of Staderini is needed.

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MISCELLANY

THE CEREBELLUM OF *Necturus* AND OTHER URODELE AMPHIBIA. C. Judson Herrick. (The Journal of Comparative Neurology, Vol. 24, No. 1.)

The cerebellum of mammals is known to develop from the rhomboidal lip bordering the lateral recesses of the fourth ventricle. The early embryonic stages of the human cerebellum resemble rather closely the adult condition of *Necturus* save for the absence in the latter case of the pons flexure.

In *Necturus* each lateral recess is continued forward into a blind anterior diverticulum whose walls are massive on all sides. Cerebellar tissue is present in the antero-medial wall and the floor of the lateral recess and in the walls of its diverticulum in the auricular lobe. The postero-lateral wall of the lateral recess is formed by a thickening, the anterior lobe of the area acustico-lateralis, intermediate in structure between the cerebellum and the posterior or primary lobe of the area acustico-lateralis. The thin plate of cerebellar tissue in the antero-medial wall of the lateral recess of each side is called the body of the cerebellum (*corpus cerebelli*), because it seems to be the direct precursor of the chief cerebellar mass of higher amphibians and reptiles. The cerebellar tissue in the floor of the lateral recess (*eminentia ventralis cerebelli*) gives rise to the greater part of the feebly developed brachium conjunctivum and is therefore probably the primordium of the roof nuclei and the nucleus dentatus of the mammalian cerebellum.

The corpora cerebelli of the two sides are connected dorsally by a strong commissural system. In *Necturus* and *Amphiuma* the gray matter of the cerebellum does not reach the mid-dorsal plane except for a few cells of doubtful significance associated with the cerebellar commissure. In *Cryptobranchus* there is a thin bridge of gray matter extending across the mid-dorsal plane, which in higher urodeles-like *Amblystoma* becomes massive.

The fiber connections of the cerebellum of *Necturus* are essentially similar to those of the area acustico-lateralis farther back in the rhomboidal lip, save for the presence of the dorsal cerebellar commissure and the absence of the demonstrated root fibers of the cranial nerves. Fibers of the VIII and lateral line nerves terminate freely throughout the area acustico-lateralis, but no medullated fibers of these systems reach the body of the cerebellum in this species. Unmedullated correlation fibers, and possibly unmedullated root fibers, pass between the area acustico-lateralis and the cerebellum. The body of the cerebellum receives strong medullated tracts from the spinal cord and oblongata and from the tectum mesencephali, also an unmedullated tract from the hypothalamus (*tractus mammillo-cerebel-*

laris). There are two spino-cerebellar tracts, a dorsal and a ventral. The dorsal tract ends chiefly in the body of the cerebellum of the same side; the ventral tract ends partly uncrossed, but most of its fibers enter the cerebellar commissure to reach the body of the cerebellum of the opposite side. These tracts probably also carry ascending fibers from the sensory nuclei of the oblongata to the cerebellum of the same and the opposite side.

The efferent tracts from the cerebellum, so far as demonstrated in *Necturus*, decussate in the ventral commissure and reach the tegmentum of the opposite side of the medulla oblongata and mid-brain, these cerebello-tegmental fibers being strictly comparable with the internal arcuate fibers arising from the entire length of the somatic sensory area of the medulla oblongata. The more anterior members of this system are directed forward and decussate under the mid-brain, thus constituting the brachium conjunctivum.

The dorsal decussation of the velum medullare anterium has the following components: (1) fine medullated fibers connecting the corpora cerebelli of the two sides; (2) unmedullated fibers running in the superficial molecular layer and similarly connecting the two corpora cerebelli; (3) tractus spino-cerebellaris ventralis; (4) tractus spino-cerebellaris dorsalis; these fibers probably entering the commissure only in very small numbers; (5) fibers of the mesencephalic V root; (6) fibers of the IV nerve root. The fifth and sixth of these components have no functional connection with the cerebellum.

The author found no evidence that any root fibers of the V nerve terminate in the cerebellum. The mesencephalic V root traverses the cerebellum in many small bundles, some of which decussate with the cerebellar commissure; but these fibers all appear to pass through into the tectum mesencephali, there to effect connections with the neurones of the nucleus magnocellularis tecti.

The anatomical connections of the cerebellum of lower urodeles conform in general to the scheme of cerebellar organization (statotonus hypothesis) recently set forth by Edinger ('12), though in much simplified form, and there are doubtless many additional details still to be worked out. The relations of the area acustico-lateralis and eminentia ventralis cerebelli of urodeles to the definitive cerebellum of higher vertebrates present problems of considerable interest, whose further investigations is now in progress.

JELLIFFE.

PSYCHOSES OF PERNICIOUS ANEMIA. G. H. Williams. (J. A. M. A., Sept. 12, 1914.)

The author reports two cases of pernicious anemia in which a psychosis appeared in a form hard to classify except among the intoxication psychoses. In both there was lack of orientation; in one in every field, especially in regard to place; lack of insight; persecutory delusions; memory in one case impaired and in the other normal, while in the other there was a lack of accuracy in recent and remote events; some degree of euphoria; lack of attention and appreciation and numerous physical signs, such as paresthesia, partial anesthesia, vertigo, speech disturbance, arm and leg paresis, ankle clonus, unequal patellar reflexes, Romberg sign and unsteady gait.

Book Reviews

THE SCAPEGOAT: THE GOLDEN BOUGH. Part VI. By J. G. Frazer, D.C.L., LL.D. Professor of Social Anthropology in the University of Liverpool; Fellow of Trinity College, Cambridge. The Macmillan Company, New York.

One of the earliest impulses of the human race is the necessity for transferring its misfortunes and sins to some thing or some one in order that the suffering individual or people may go free. This appears in crude and absurd form among savages, lingers as a persistent idea even among civilized nations to-day, and has formed a central tenet of the highest systems of religious faith.

It is impossible to do more than hint at the abundance of material gathered in this volume, through which Dr. Frazer gives us a description of the many subtle modes of putting this idea into practice, as he traces its development from its most primitive to its most highly developed form. He shows us the savage laying his burden upon a stick or a stone, in childish faith leaving it there. He reminds us that such simple means of transference are practised to-day among members of civilized nations and reviews for us many a merry festival and quaint ceremonial among the peasants of Europe in which this idea bears its underlying part.

But he is most concerned with the advance of the idea as it came to mean the bearing away of sins by a divine scapegoat, in animal or more often in human form, who accomplished his mission in his death. That the public scapegoat came to be a divine victim, who removed the sins only through his death, Dr. Frazer believes to be the result of a very ancient coalescence of two ceremonials, this of the transference of the burden and a still older one of the death of a god at a certain period of the year, usually the time of sowing and planting, necessary for preventing the decay of the god and thus insuring his immortality, at the same time by imitative magic renewing the life and fertility of the earth and all upon it. It is not only likely that the people would make use of this earlier, periodically occurring sacrifice to combine the public scapegoat with the dying god, but by a careful gathering of evidence this is proved to have been done, while the practice still lingers in attenuated form in many superstitious festivals, where the part of the god is filled now only by effigy. It is a result of the gradual refinement of civilization, as Dr. Frazer shows, that the sacrifice of the god, originally laid upon an honored human representative, should have been performed later upon a condemned criminal, whose life was already forfeited, and at last only by effigy; but with the mitigation of the ancient cruelty of the custom it is but natural, too, that its original significance should gradually be lost sight of.

The death and resurrection of the god were enacted periodically in ancient Mexico, as is well attested by early explorers, from whose reports the author gives us a full account of the ghastly ceremonies. Reasoning by analogy he presumes that among other peoples of no higher civilization than these ancient Mexicans had attained this custom also existed in

ancient times, and proves this by a study of the Saturnalia and kindred celebrations throughout Europe and Western Asia, explainable in no other way and furnishing evidence that they are indeed the survivals of the more cruel practice of sacrificing a human representative of the god. In historic times this lingers still in the execution of a criminal after letting him first play the part of a mock king or divine representative.

In a note appended to this second edition Dr. Frazer offers an hypothesis, highly conjectural he admits, but the value of which he leaves to further research. He suggests that in the crucifixion of Jesus we have an example of the celebration of the Jewish feast of Purim, a festival which forms the subject of the book of Esther and is borrowed he thinks from their Persian captors, in which a human victim as Haman met his death, while his successful rival, Mordecai the mock king, went free. The author thinks it highly probable that Pilate allowed the Jews to utilize this annual celebration to make away with the hated teacher, Jesus here filling the place of the criminal, first bearing the mock kingly honors. By this very means, however, he became known as the god dying for mankind, the scapegoat for man's sins, the life-giving god for all the world, an idea that found ready acceptance throughout the ancient regions where it had long been held and put into practice.

Be this as it may, surely the highest conception of the ancient idea is reached in the Christian faith, where is offered that high sublimation of the instincts underlying life, which frees mankind from the bondage of these instincts through the force of individual independence and freedom of service, wherein the broad sexual striving finds its true creative outlet.

For it is the force of these primal instincts that has made necessary a burden-bearer and demanded the sacrifice of a life that all life should be renewed and immortality—life reproducing itself—be assured. It is their inexorable demand that underlies the tragic horror revealed in the book. We have here another insight into the depths of human nature given us by one who penetrates to hidden sources and finds a universal meaning underneath the apparent tragedy and the apparent meaninglessness and folly in the modified forms of the ancient customs. No part of it is vain. No bit of gorgeous trapping, no trinket of gaudy finery in which the victim is bedecked for the cruel sacrifice, no item later of mock ceremonial and jovial pastime but has its deeper significance. Every detail of decoration, every act of performance, every number definitely belonging to the ceremony reveals the universal symbolism through which these fundamental instincts express themselves.

It is from such world-wide investigations as this one that we come to know human nature and its inheritance from ages of that striving and development which have formed the vast, unconscious background, whose value and boundless influence we are but beginning to understand.

In the study of the psychical life we are thrown back upon it. Sufferers of nervous and mental diseases, like primal man, are grappling with primitive forces along infantile pathways. The vague terrors that we see driving the savage to take refuge in inanimate objects or in cruel ceremonials are strikingly like those that drive the neurotic along the compulsive pathway of his apparently meaningless ceremonials. It is such a comparative study of the childhood of the race, of its handling of these forces in its slow sublimation of the same that helps to a deeper understanding of inadequate mental mechanisms and offers fresh stimulus to the study of the unconscious.

JELLIFFE.

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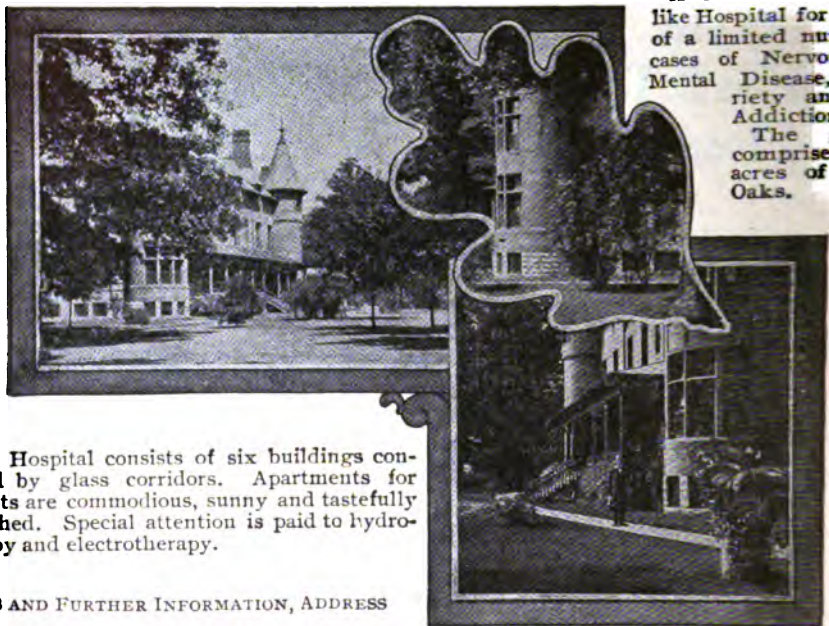
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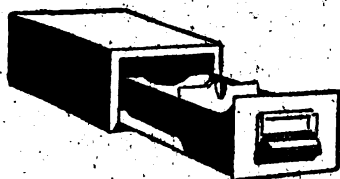
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